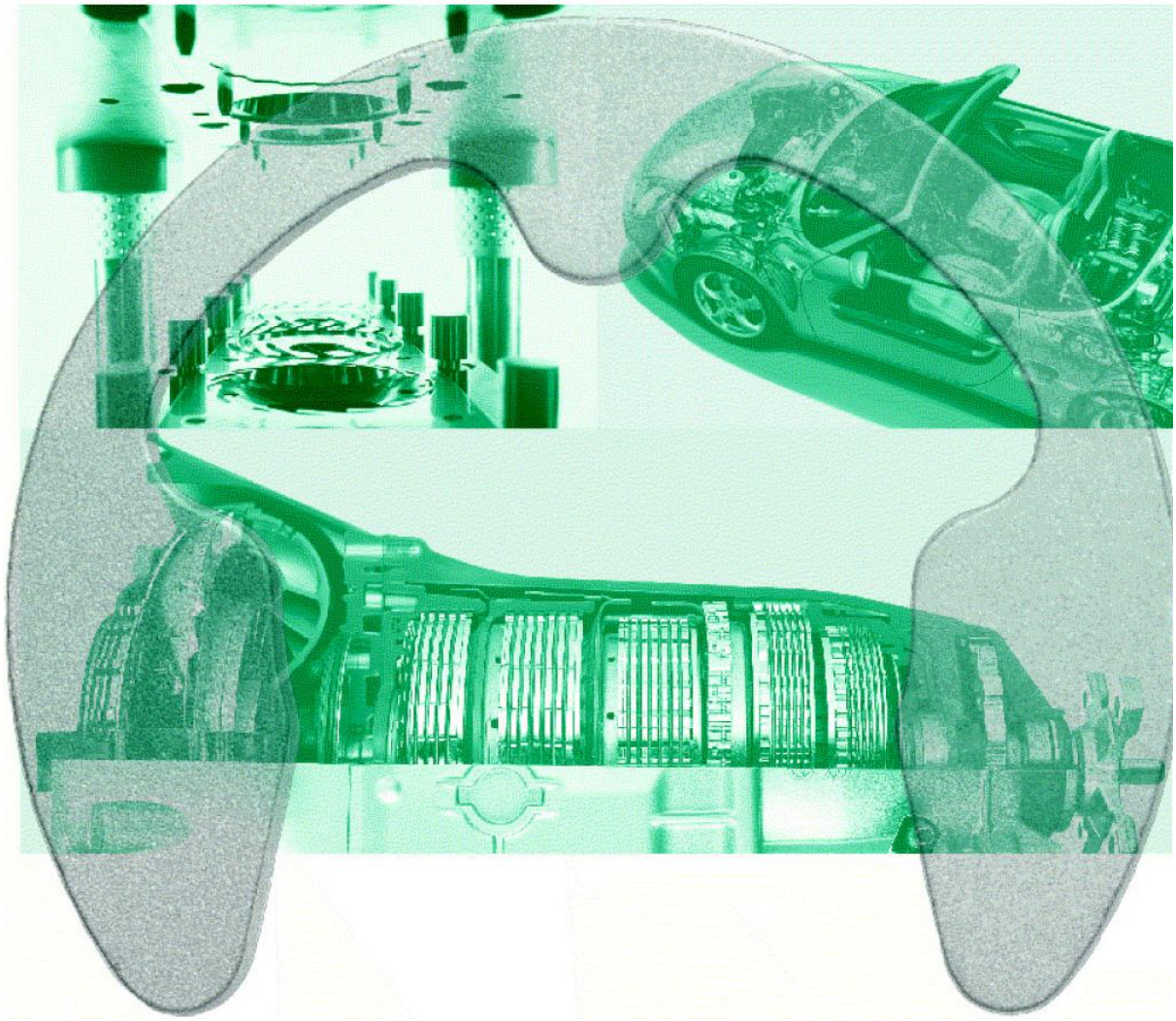

Quality Guideline for Suppliers

Preface

The availability of parts which conform to specifications, and ongoing elevation of quality targets within the automotive industry require zero defect deliveries.

Because of this, we have made it our goal to integrate our suppliers into advance quality planning for new projects as early in the process as possible.

We have created this HBQR22 in order to achieve our common goal of zero-defect deliveries.
It serves as a supplement to the VDA publication series “Quality management in the automotive industry” and IATF16949, and is tailored to the specific needs of HB.

HBQR22 offers suppliers the opportunity to actively contribute their experience and potential areas of improvement to the development process. Our work focuses on ensuring **economical** and **process capable** development. By regularly assessing project progress, we can detect critical project issues early on and solve these together with our suppliers.

Collaboration based on partnership will ensure we achieve our zero-defect goal over the long term.

Quality Management Representative

i.V. Marco Krauth

IATF16949

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Section 1
General requirements

1.1 Scope of Validity (IATF16949 Section Section 1.1)

These guidelines for ensuring supplier quality (HBQR22) apply to the production materials delivered to Hugo Benzing hereinafter referred to as HB.
They also apply to services which influence the fulfillment of customer requirements, such as sorting, reworking, and calibration services.

They apply to all suppliers throughout the supply chain who deliver products to HB, as well as to suppliers specified by customers. (Standard parts suppliers)

1.2 References

The most current edition applies for all reference documents listed in these HB guidelines and in section 5 (References). If not otherwise specified by HB, only the newest edition of the referenced documents may be used.

1.3 Quality management system (IATF16949. Section 4 / 4.4)

An effective quality management system at least fulfilling regulation ISO9001:2015 or IATF16949 is required for a supplier relationship with HB. If an ISO9001:2015 certification has been issued, but IATF16949 certification has not yet been granted, the supplier must prepare a plan to obtain this certification.

The effectiveness of the QM system is reflected in:

- Continuous and verifiable improvements of processes, procedures, and products.
- Delivery quality
- On time deliveries
- Effectiveness and speed of implementation for corrective measures
- Communication on all levels
- Completing new and change projects with proper content and on time

Certification in accordance with ISO9001 is considered a minimum requirement. If a certificate expires without a plan for recertification, HB must be notified at least three months before the expiration date. New certificates must be sent to HB without requiring a request to do so. Notification must be sent promptly if a certificate is withdrawn. Certifications must be issued by accredited certification bodies.

HBQR22 is a customer-specific requirement in the sense of certification under IATF16949. The purpose of this quality management system is to achieve a goal of "**zero defects**." HB reserves the right to complete audits (IATF16949: Section 8.4.2.4.1) of quality management systems, processes and products with its customers following prior notification. The HB agent must be granted access for this purpose.

Note:

The points listed here are intended as clarification, and do not represent a restriction to the regulations listed above.

1.4 Business language (IATF16949 Section 8.2.1.1)

Business shall be conducted in German, or alternatively in English.

1.5 Compliance with official and legal regulations (IATF16949 Section: 8.4.3.1 / 8.4.2.2 / 8.6.5)

Suppliers must fulfill all applicable and official and legal requirements, and must communicate these to their suppliers throughout the entire supply chain.

1.6 Compliance with regulations, social responsibility & sustainability
(IATF16949 Section: 8.6.5 / 8.4.2.2 / 5.1.1.1)

HB requires that its suppliers and subcontractors fulfill and apply minimum requirements for corporate ethics, work conditions, human rights and environmental protection.

1.7 Quality targets (IATF16949 Section 6.2)

Within the framework of quality planning, the supplier's most important duty is to develop a “zero-defect strategy” and to take all measures necessary to achieve the “zero-defect” quality goal.
The supplier must define internal and external quality targets to measure and evaluate the level of quality achieved. The following minimum requirements apply in this context:

- Identifying internal and external complaints.
- Identifying internal and external defect costs.

HB reserves the right to agree to quality targets with the supplier.

If the quality performance affects the safety, quality or delivery of products, the supplier must inform HB promptly.

1.8 Environment (IATF16949 Section 8.2.2.1)

Effective environmental management which ensures compliance with applicable environmental regulations and continuously and efficiently improves the supplier's economic situation is a key part of delivery reliability.

HB is committed to protecting the environment, and has been ISO 14001 certified for many years. Therefore, we expect that our suppliers likewise undertake to protect the environment by implementing an environmental management system.

Deliveries must fulfill applicable legal regulations for environmental protection.

1.9 Special features (IATF16949 Section 8.2.3.1 / 8.3.3.3)

Special features require special attention, since deviations in these features can have a significant influence on product safety and service life, installation capabilities, the function or quality of downstream production operations and compliance with statutory requirements. Such features are stipulated by HB and/or derived from the supplier's risk analysis, for instance from the product and/or process FMEA.

In general, all product and process features are considered important and must be complied with.

Special features are:

- Features requiring special verification (D features)
- Features important to functionality (H features)
- Features important to the process (H features)

1.10 Products and features with specific verification (IATF16949 Section 8.2.3.1 / 8.3.3.3)

This includes products whose features have a significant influence on vehicle safety or on compliance with statutory requirements. These are expected to pose certain risks in relation to product liability. If HB is responsible for product design, then such products and their features are designated in the technical documentation. If the supplier is responsible for design, then such products and features are identified during the design process. HB specifications must be observed. The supplier undertakes to install an appropriate system for handling products and features that require special verification.

Verification content must conform to the requirements of VDA volume 1 and must be designed so that due diligence can be verified in case of a damage claim. (Discharge from liability)

This verification is called special archiving. Affected documents and records are called Documents requiring special archiving (DRSA). See section 4.1

Documents must be traceable, such that supplier data can be clearly associated with them, down to the production and testing batch. A functional product derivation system must be ensured, down to the subcontractor level.

1.11 Subcontractors – Changing subcontractors (IATF16949 Section 8.4)

The supplier is responsible for the development of its subcontractors in accordance with the requirements of Section 1.2. If the supplier assigns contracts to subcontractors, they must also fulfill the requirements of these guidelines. Section 3.3 Submission phases point 16 must be observed.

HB must be notified in advance if a subcontractor will be changed. Such changes require approval. A production process and product approval (PPA) must be completed.

HB reserves the right to audit subcontractors as well, if necessary, with its customers, following prior notification. However, this does not release the supplier from its responsibility towards the subcontractor and HB.

1.12 Production process and product approval (IATF16949 Section 8.3.4.4)

Production process and product approval is carried out either in accordance with VDA volume 2 (PPF) or in accordance with the production part acceptance process of the AIAG (PPAP), unless HB has stipulated one of these two or another process – important: The current valid version is required. It must be ensured that all activities for process and quality planning are completed before the production process and product approval.

Tool costs shall be paid in full following the production process and product approval.

1.13 Changes to the product or process (IATF16949 Section 8.2.4 / 8.5.6)

Changes to the product or process that deviate from the most recent PPA/PPAP approval must be reported in advance, require approval, and must be documented in a product and process life cycle. These requirements also apply to electronic components and software.
The effects of a change, including changes initiated by subcontractors, must be assessed, verified and validated to ensure HB requirements before they are implemented.

Any changes may not be implemented before a written HB release.

1.14 Product safety (IATF16949 Section 4.4.1.2)

Since product safety and product liability are highly important within the automotive industry, the supplier bears manufacturer responsibility (product liability) for its parts and processes purchased by HB to manufacture the final products. This also includes parts and processes of the supplier's own suppliers. The supplier must have documented processes for managing products and production processes that are relevant to product safety. The documented process must fulfill at least the specifications of IATF16949 listed under Section 4.4.1.2. An Product Safety and Conformity Representative (PSCR) formerly Product Sicherheitsbeauftragter (PSB) has to be appointed and determined.

1.15 Complaint processing (IATF16949 Section 10.2.6)

Once a supplier becomes aware of possible problems in the areas of safety, quality or supply, it is required to inform HB of this promptly.

After complaints by HB, immediate error correction measures must be initiated, documented and submitted on time and upon request by HB in a structured format, using an 8D report (automotive standard). Cause analyses should generally be completed using suitable problem-solving methods. In addition, detailed analyses (5 Why method, Ishikawa, error simulations, etc.) must be carried out. These documents must be submitted to HB upon request.

The same contractual principles and regulations as are effective between HB and the customer (customer-specific requirements e.g. Special Terms - MB, QD83 - ZF) must be applied to process customer complaints.

- If necessary, immediate measures must be reported to HB in writing at the latest within one business day.
- Defective goods will be returned promptly at the cost of the manufacturer / supplier.
- The final effectiveness of corrective measures must be reported to HB.

HB reserves the right to verify such reports.

Labeling inspected parts in case of a complaint
Labeling for the first error-free delivery batch must be agreed upon with HB.

Subsequent deliveries from inventory or work in process which has been subject to a 100% inspection due to a complaint must be labeled accordingly.

Complaints from the field
If complaints are received from the field, the supplier must complete diagnostics on the returned components. Relevant measures according to the VDA volume “Damaged parts analysis field” (current valid version is required) must be applied for components where the diagnostics process found no defects (NTF - No Trouble Found).
If the returned components must be destroyed during the defect analysis, written approval from HB must be obtained in advance.

Section 2
QualityPlanning (AIAG-APQP / VDA-RGA) (IATF16949 Abschnitt 8.1 / 8.3.2.1)

It is HB's goals to involve its suppliers in quality planning for new projects at the earliest possible stage. As part of project management, HB requires that its suppliers carry out systematic planning according to VDA Reifegradabsicherung für Neuteile - Maturity level assurance for new parts or AIAG APQP, insofar as HB has not established another process. The used methodology must be agreed with HB in advance, HB reserves the right to instruct the methodology. This plan applies to products manufactured by suppliers as well as their purchased parts.

The early detection and avoidance of quality risks is a key factor in the success of error-free and stable series production.

2.1 Feasibility analysis (IATF16949 Section 8.2.3)

Technical documents (such as drawings, specifications, customer-specific requirements, environmental requirements, recycling, regulations, requirement specifications, etc...) prepared or created by HB must be analyzed by the supplier as part of the contractual review.

This analysis must include both a review of feasibility for the planned development project (development suppliers only) and a review ensuring manufacturing can be carried out in an economical and process capable manner (procedures, materials, tolerances, parts and features requiring special verification, etc.). This is an instrument for simultaneous engineering. This review offers the supplier an opportunity to contribute their experience and suggestions, to the benefit of both parties.
In addition, packaging and shipping issues must be taken into consideration.

The feasibility analysis must be submitted when an offer is submitted to Purchasing, and is a requirement before a contract is awarded. Feedback will be provided using form 5.1 “Feasibility analysis.” If requested by HB, a confirmation of capacity must be included with the feasibility analysis. Feasibility must be reviewed and confirmed for all product or process changes that affect existing contracts. The confirmed feasibility analysis must be included as part of all initial sample testing reports.

2.2 Planning content (IATF16949 Section 8.1.1)

Planning for implementing the activities described here must be submitted to HB in a suitable format, unless HB waives this requirement.

2.2.1 Project plan (schedule) (IATF16949 Section 8.1)

Based on the deadlines specified by HB, the supplier must prepare a project-specific schedule and provide it to HB if required. This schedule indicates deadlines which must be complied with for returning required forms, according to the APQP, VDA-RGA and VDA volume 4 (the current valid version is required).

2.2.2 Product description (for development suppliers only) (IATF16949 Section 8.2.2)

The product description begins at a very early stage of the purchasing process
(before the APQP- / RGA phase). It is intended to help HB ensure that all requirements of HB and the customer are recorded and included in all relevant documents.
The supplier must implement customer requirements in all necessary product descriptions (such as drawings, internal standards, requirement specifications, etc.).

2.2.3 Quality targets (IATF16949 Section 6.2)

The supplier must define internal quality targets for measuring and assessing the level of quality achieved.

2.2.4 Special features (IATF16949 Section 8.3.3.3)

Special features are defined in accordance with Section 1.9. They must be identified by the supplier and designated on all relevant product and process documents, such as drawings, FMEAs, risk analyses, work, testing and product management plans.

These features must be taken into consideration and monitored in all relevant planning steps.
Retention periods for documents are stipulated in Section 4.1 according to the verification for special features.

2.2.5 Process sequence plan (IATF16949 Section 8.3.5.2)

The supplier must prepare a process sequence plan for the entire process chain.

2.2.6 Creating the work schedule (IATF16949 Section 8.3.5.2)

Work schedules must be prepared for all replacement parts and finalizations. These must include all information regarding process steps, internal/external transportation, and the machines and operating materials to be used.

Required production / blank part drawings and process descriptions must be prepared in accordance with requirements.

2.2.7 Product and process FMEA (IATF16949 Section 8.3.5.2)

The Failure Mode and Effects Analysis (FMEA) must be completed to investigate potential risks and assess their importance, likelihood of occurrence and possibility of discovery. These risks must be minimized by introducing appropriate measures. The FMEA is, therefore, an important method for avoiding errors.

An FMEA must include all phases of the product life cycle, such as design, production, assembly, packaging, transportation, and use by the customer.
FMEAs must be prepared or revised, for instance, at the following points:

- Development/production of new parts
- Introduction of new production processes
- Changing locations
- Drawing modifications
- Process modifications
- If defects occur

The AIAG/VDA Handbook (harmonized version) describes the methodology and evaluation in detail - important: Current valid version is required.

Product (design) FMEA
A product FMEA must be completed for all components designed by the supplier.

Process FMEA
A process FMEA must be completed for all process steps for a component. The results of the product FMEA and the special features designated by HB (1.9 / 2.2.4) must specifically be taken into consideration. In addition, lessons learned from similar processes and products must be taken into consideration.

Implementing measures
Risks identified through an FMEA must be minimized with suitable measures. Deadlines and responsibilities must be defined for implementing these measures such that measures can be completed before the start of series production delivery. HB must be informed promptly of required design changes.

2.2.8 Test planning (for development suppliers only) (IATF16949 Section 8.3.4.2)

Development suppliers must prepare and carry out a plan for reviewing the design (development results) to ensure it fulfills design specifications. This plan must include information, for instance, on the time, type and scope of validation and the type and scope of sampling.

Differences between the plan and implemented design must be evaluated.

2.2.9 Approvals for product and process development (IATF16949 Section 8.3.5)

The supplier must assess and document its approvals for the individual stages of product and process development.

2.2.10 Production management plan (QM plan / control plan) (IATF16949 Section 8.5.1.1)

The production management plan serves as a preventative planning tool for securing the process. It is prepared by a team, and involves a systematic analysis of production, assembly and testing processes.

This team should consist of employees from planning, production and quality assurance, as well as other affected departments.

Production management plans should include the results of the product FMEA, process FMEA, experience from similar processes and products and the application of improvement methods, etc.

The production management plan must be prepared for all phases of production, and must include at least the elements listed in form 6.2 production management plan/control plan.
A detailed description of the process for preparing the production management plan / control plan is provided in VDA volume 4, VDA-RGA and in the AIAG APQP requirements.

2.2.11 Series production monitoring coordination (IATF16949 Section 8.5.1)

In general, all product and process features are considered important and must be complied with.

Special features require a verification of process capability. The supplier must monitor these features using suitable methods, such as quality control charts (SPC) for this purpose.

If process capabilities cannot be verified, 100% testing is required.

Features that cannot be measured, or that can only be tested through destructive testing, must be monitored using suitable methods and documented.

Planned series production monitoring for special features must be agreed upon with HB if necessary and documented accordingly in the production management plan.

2.2.12 Planning and purchasing equipment and operating materials (IATF16949 Section 7.1.3.1)

Planning for equipment and operating materials includes planning and preparing / purchasing all necessary operating materials to manufacture the component. The capability or suitability of the operating materials must be verified. If multiple devices or multi-cavity molds are used, their capabilities must be verified individually.

It must be ensured that operating materials with sufficient capacities are available at the latest when manufacturing series production parts for the initial sampling deadline. In addition, all equipment and internal and external means of transportation must be taken into consideration.

2.2.13 Test planning (IATF16949 Section 8.5.1)

Preparing the test plan
The supplier prepares a test plan based on the production management plan / control plan. It must include all features to be tested, with the associated testing materials for each work step. The features must be classified according to their particular importance. In addition, the testing frequency and manner of documenting results must be indicated on the test plan.

Machine and process capability studies must be planned for special features. If necessary, the capability values can be defined in the sampling coordination meeting - see also VDA Volume 2. Extensive information are also available in VDA Volume 4 or AIAG SPC (current valid version is required), or 2.2.15 Minimum requirement for capability parameters. Employee training and setting up work stations for statistical process control (SPC) must be taken into consideration in planning, in addition to the work necessary to carry out the testing.

2.2.14 Planning and purchasing testing materials (IATF16949 Section 7.1.5.1)

Planning testing materials
The supplier must identify the testing method and relevant testing materials for all features.

Implementing testing material planning

Purchasing or ordering must be completed before series production (PPA/PPAP).

Suitability of testing processes
The suitability of the testing process must be verified for all planned measuring equipment. The entire measurement process and the tolerance of the feature to be measured must be taken into consideration.

Verification must be completed in accordance with the requirements of VDA volume 5 (testing process suitability) or AIAG-MSA.

2.2.15 Capability certification (IATF16949 Section 8.3.5.2 / 9.1.1.1)

The machine capability inspection (MCI) and process capability inspection (PCI) must be completed according to the automotive industry standards: VDA volume 2, VDA volume 4 or AIAG SPC – current valid version is reqired (s. a. 2.2.13)

The following clarifications are provided in accordance with the VDA.

Minimum requirements for capability parameters:

- Machine capability / Short-term capability Cm/Cmk ≥ 1.67
- Preliminary process capability Pp/Ppk ≥ 1.67
- Process capability / Long-term process capability Cp/Cpk ≥ 1.33

Machine capability inspections (MCI) / short-term capability
Machine capability inspections must be planned as such that all verifications are submitted at the latest by the initial sampling deadline (PPA/PPAP).

Preliminary process capability inspection (PCI)

The evaluation of the preliminary PCI must be submitted first, consisting of at least 25 samples with 5 measured values each. If not otherwise agreed with HB, an additional 100% test or equivalent error limiting procedure must generally be continued until preliminary process capability has been verified.

Process capability inspections (PCI) / long-term process capability
Once it has been established according to the above regulations, long-term process capability must be submitted to HB. In addition, the results of the PCI must be submitted upon request.

2.2.16 Planning preventative and predictive maintenance (IATF16949 Section 8.5.1.5)

To ensure delivery capabilities, a system must be developed to carry out preventative and predictive maintenance for manufacturing equipment.

A maintenance plan must be prepared, including maintenance intervals and the scope of maintenance. Consistent completion of maintenance work must be documented.

In addition to stipulating preventative maintenance intervals, an emergency strategy (emergency plan) must be prepared for the processes that impact delivery capabilities. These include, for instance, machines that can result in production backups and special tools.

2.2.17 Status of subcontractors and purchased parts (IATF16949 Section 8.4)

If the supplier awards contracts to subcontractors, they must also fulfill the requirements of the quality guidelines. A list of subcontractors used must be submitted upon request.

Status of subcontractors
The use of qualified subcontractors for the project must be ensured. If requirements are not fulfilled, development programs must be determined. Programs must be implemented before the start of series delivery.

Status of purchased parts
The status of quality planning must be presented regularly. Activities must be designed as such that the production process and product approval (PPA/PPAP) for purchased parts is completed before production process and product approval for the overall project.

2.2.18 Logistics (IATF16949 Section 8.1.1 / 8.3.5.1 / 8.5.4)

HB will conclude a logistics agreement with the supplier if necessary.

Independent of whether such an agreement has actually been concluded, however, the following minimum requirements apply unless expressly otherwise agreed.

Packaging planning and labeling

The supplier is responsible for packaging its components. Packaging must be designed such that the product cannot be damaged or contaminated by external influences during transportation. The supplier must contact HB to coordinate the type of packaging used promptly before the start of series delivery.

Preservation
All products that could be impacted due to interactions with the environment must be suitably protected. The supplier must contact HB to coordinate the type of preservation used (if necessary) promptly before the start of series delivery.

Transportation planning
In order to avoid damage during internal and external transportation, suitable means of transportation must be planned.

Part management
In order to avoid batches becoming mixed and to ensure traceability, blank parts, parts purchased from subcontractors and parts produced in-house must be processed and delivered using a “first in - first out” principle with batches designated on the container. Traceability must be ensured for each production batch.

Cleanliness
The supplier is responsible for the cleanliness of their parts and packaging. Residual contamination specifications of HB must be taken into consideration and observed.

If required by HB, the supplier must ensure that packaging for electronic components fulfills specific electrostatic discharge (ESD) protection specifications.

2.2.19 Personnel (IATF16949 Section 7.1.2/7.2)

Capacity
The capacity of qualified employees must be planned to manufacture the additional scope of production required. Planning must be designed such that suitable capacities are available at least by the start of production.

Qualification
When setting up a new work station or changing work stations, each employee must be trained according to the new specifications they will be dealing with. Relevant verifications must be kept.

2.2.20 Work station approval (IATF16949 Section 8.3.5.2)

Before beginning production, the supplier must complete an approval process for all production and assembly work stations. It must be ensured that the following requirements are available and complete.

- Capability certification
- Error simulation completed and documented (e.g. verification aut. testing equipment)
- Complete and valid work documents (such as work, production management, test plans, ...)

- Operating materials
- Maintenance plans
- Test equipment
- Transportation equipment
- Materials provided with indexed accompanying documents

The review must be completed with a suitable check list. All work steps in production and assembly must be included. Any deviations found must be documented. Responsible individuals and completion deadlines must be defined for completing corrective and improvement measures.

After the identified measures are completed, another review must be completed in consideration of the previously found deviations. The results must once again be documented.

Approval for initiating production may only be provided after test results for all points are successful, and must be documented.

2.2.21 Prototype production (IATF16949 Section 8.3.4.3)

A prototype testing report must be submitted for prototype parts upon initial delivery, and in case of any changes. The VDA volume 2 initial sample form must be used (current valid version is required). This has to be defined in the sampling coordination meeting aacording to VDA volume 2. This report must verify all drawing features and the scope of changes using at least one part.

2.2.22 Audit planning (IATF16949 Section 7.2.3/7.2.4/9.2)

The supplier must prepare a project-specific audit plan stipulating the regular completion and scope of internal product and process audits. VDA volume 6 part 5 or VDA volume 6 part 3 or equivalent processes must be applied. Audits of subcontractors must be taken into consideration.
Suppliers must be used according to qualified auditors, in order to comply with automotive standards. Specific requirements for audits with respect to special processes and products (CQI, customer-specific requirements, etc.) must also be taken into consideration.

2.2.23 Production output (Run at Rate) (IATF16949 Section 8.3.5.2)

The supplier must use a run at rate to verify that it can provide the required output.
In addition, the supplier must include the completed Supplier capacity monitoring form, at the latest by sampling, to confirm that it can produce the required quantities.

2.2.24 CQI / Qualification of special processes (IATF16949 Section 9.2.2.3)

The CQI guidelines (Continuous Quality Improvement) are issued by the USA automotive association AIAG (Automotive Industry Action Group). CQI questionnaires are available at www.aiag.org.

The relevant guidelines must be taken into consideration by suppliers and subcontractors with special processes according to the AIAG.

Heat treatment process (CQI9)
Heat treatment processes are considered a key performance element. Therefore, HB assumes that its suppliers and subcontractors will complete the CQI9 assessment. If this is not the case, we request that the supplier send an action plan for implementation.

CQI assessments are self-assessments, and must be completed at least 1x per annum according to CQI specifications – for each CQI-Standard the current valid version is required.

Self assessments (cover sheet) must be submitted to HB upon request. The assessment report may be viewed at supplier (on site).

2.3 Damaged parts analysis field / No trouble Found (IATF16949 Section 10.2.5 / 10.2.6)

The supplier must plan methodical analyses according to the VDA volume (current valid version is required) – Joint quality management in the supply chain – Marketing and customer service – Damaged parts analysis field for field complaints.

2.4 Traceability (IATF16949 Section 8.5.2.1)

The supplier must install a defined process that can be used to trace the individual part or batch, or production quantities down to each individual work step and production batch.
The entire supply chain must be included, down to the blank or purchased part.

2.5 Cleanliness (IATF16949 Section 8.2)

All types of contamination and their sources, throughout the entire process chain, must be included in the FMEA according to specific requirements. Subcontractors, machine manufacturers and service providers must also be included.

The product, packaging and all associated processes must be planned so as to avoid the creation, collection, and transfer of dirt and contamination.

Section 3

Production Part Approval Process (AIAG) /
Production process and product approval (VDA-PPF)

3.1 Initial samples (IATF16949 Section 8.3.4.4)

Initial samples are products manufactured and tested under series production conditions (machines, equipment, operating and testing materials, processing conditions).

Test results for all features must be documented in an initial sample testing report. The number of documented parts must be agreed upon with HB.
Initial samples must be delivered to HB by the agreed deadline along with the initial sample testing report and documents according to the submission phases (see Section 3.3). These must be clearly labeled as initial samples.

In order to identify the features, the same numbers must be used in the initial sample testing report and in the current drawing, which is to be included and which must have been approved by HB.

Assemblies produced according to an HB/ customer design must be subject to initial sample testing, including their individual parts. This test must be submitted to HB.
The supplier must submit a sample of the assembly to HB for products it has designed. Initial samples must also be provided for replacement parts and any sub-assemblies. HB must be allowed to inspect this documentation if necessary.

Deviations from HB specifications that are not identified during the production process and product approval shall entitle HB to submit complaints at a later date.

3.2 Reasons for initial sampling (IATF16949 Section 8.3.4.4 / 8.5.6.1)

In accordance with the regulations indicated, initial samples are required:

- When a product is ordered for the first time (noted in order).
- After the supplier changes subcontractors.
- After a product change for all affected features
- After a drawing index change for all affected features
- After a supplier blockage (business on hold)
- After a delivery interruption of more than one year.
- After a production interruption of more than one year
- In case of a changed production process
- After the use of new / changed molding equipment (such as casting, punching, roller, forging or pressing tools, with multiple molds / nests - each nest.)
- After changing production locations or using new or moved machines and/or operating materials.
- After using alternative materials and designs.

Exceptions in terms of procedures and scope are only permitted in coordination with HB, e.g. in the following cases: Delivery interruption / production interruption of more than one year, small series, standard and catalog parts.

3.3 Submission phases (IATF16949 Section 8.3.4.4)

In general, submission phase 3 applies if not otherwise agreed with HB.

PPAP Elements		HB – Submission phase				
		1	2	3	4	5
13	Cover sheet initial sample testing report according to VDA Vol.2 or PSW in accordance with QS 9000 PPAP	**X**	**X**	**X**	**X**	**X**
7	Testing results: Dimensions, surface, residual contamination, etc.	**V**	**X**	**X**	**X**	**X**
8	Testing results material	**V**	**X**	**X**	**X**	**X**
14	Testing results look, feel, acoustics, odor, etc.	**V**	**X**	**X**	**X**	**X**
9	Testing results machine capability inspections (MCI), process capability inspections (PCI)	**V**	**X**	**X**	**X**	**X**
8	Testing results Function, reliability verification, performance tests	**V**	**X**	**X**	**X**	**X**
16	Sample parts	**X**	**X**	**X**	**X**	**X**
1	Documents (e.g. customer drawings, CAD data, specifications, etc.)	**V**	**X**	**X**	**X**	**V**
2	Approved design changes, design change documentation	**V**	**X**	**X**	**X**	**V**
3	Design, development approval from the supplier if he is responsible for design	**V**	**X**	**X**	**V**	**V**
4	FMEA - Design FMEA	**V**	**V**	**X[1]**	**X[1]**	**V**
6	FMEA - Process FMEA	**V**	**V**	**X[1]**	**X[1]**	**V**
5	Process sequence diagram (production test steps	**V**	**X**	**X**	**V**	**V**
12	Production management plan / control plan	**V**	**V**	**X**	**X**	**V**
18	Test equipment list (product-specific)	**V**	**V**	**X**	**X**	**V**
10	Test equipment capability inspection	**V**	**V**	**X**	**V**	**V**
19	Verification of compliance with statutory and customer-specific requirements (e.g. environment, safety, recycling)	**V**	**V**	**X**	**V**	**V**
	Ingredients, IMDS data sheet	**X**	**X**	**X**	**X**	**X**
11	Documentation of a qualified laboratory	**V**	**X**	**X**	**V**	**V**
15	Check list for requirements for process engineering products	**V**	**V**	**V**	**V**	**V**
17	Reference sample	**V**	**V**	**V**	**V**	**V**
	List of all subcontractors used with assigned parts and processes including PPA/PPAP status	**V**	**V**	**X**	**V**	**V**
	Feasibility (HB form or own form)		**X**	**X**	**X**	**X**
	Capacity confirmation (HB form or own)		**X**	**X**	**X**	**X**

X: Submitted to the HB quality office, a copy must be stored in the manufacturer plant.

V: To be stored in the manufacturer plant, must be immediately available upon request by HB.

X[1]: The supplier confirms that an FMEA has been prepared, or submits a copy of the FMEA cover sheet. In general, the supplier retains the FMEA, and it must be submitted to HB or provided at the supplier's facility upon request by HB.

3.4 Material data recording (IATF16949 Section 8.3.4.4)

Material data must be recorded in the IMDS (International Material Data System www.mdsystem.de) for production process and product approval.

Missing material data sheets (MDS) could result in a negative supplier assessment.

3.5 Initial sample documentation (IATF16949 Section 8.3.4.4)

Initial sample documentation according to the required submission phase (Section 3.3) must be included with the initial sample deliveries. According to VDA volume 2 – current vailid version is required - a sample coordination meeting is absolutely necessary in order to coordinate and communicatde the scope of the documentation. Missing, incomplete, or defective initial sample documentation could result in a negative supplier assessment. Initial samples without complete documentation will not be processed and may result in subsequent costs to be charged to the supplier.

3.6 Deviations in initial samples (IATF16949 Section 8.3.4.4 / 8.7.1.1)

Documents, records and initial sample parts may only be submitted if all specifications have been fulfilled. In case of deviations, the suppliers must obtain written approval (deviation approval) from HB in a suitable format and include it with the submission.

Initial samples with deviations for which no deviation approval has been issued will not be processed by HB.

3.7 AIAG-PPAP / VDA-PPF submission process (IATF16949 Section 8.3.4.4)

PPF/PPAP documents must be submitted according to the process required by HB. Incomplete or incorrect PPF/PPAP documentation will be rejected – s. a. 3.3 / 3.5

Section 4
Additional requirements

4.1 Retention periods (IATF16949 Section 7.5.3.2.1)

The supplier must define and comply with retention periods for documents, records and reference samples.

Industry-specific retention periods and the features of relevant documents are described in the following standards:

- IATF 16949 (Section 7.5.3.2.1)- Retention obligations

- VDA1 – Documentation and archiving – Guidelines on documentation and archiving quality requirements
- AIAG (6) – Retention obligations

Imortant: In each case the current valid version is required

Here is a summary from HB of recommended minimum archiving obligations for the automotive industry

Classification	Class designation	Beginning of archieving time	Documets	Archieving time (years)
Product development	Documentation of serial- and end product, including corresponding approvals	Day of creation	- Acceptance report - Development release - Total release - Etc.	30
	Development knowledge for follow-up projects	Day of creation	- Development changes and measures - Test reports - Lessons Learned - Etc.	10
	Documentation of product development according to pre-series	Day of creation	- Analysis report, - Calculation model - Failure modes and corresponding measures - Etc.	5
Procurement and logistics	Documentation regarding logistic and controlling of production	Day of creation	- Inventury documentation - Material demand planning - Transport- / logistic documentation - Etc.	10
	Order documentation	Day of creation	- Orders acc. to contract - nomination - procurement- / delivery contracts - Etc.	15
	Request and Quotationdocumentation without contract data	Day of creation	- Offer request documentation - Supplier evaluation - RFQ containers and documents - Etc.	7
Production	Documetation of running production	Day of creation	- Test- / measuring results - Final inspection reports - Production- / test data - Etc.	30
	Quality documentation regarding production planing	Day of creation	- Part submission warrant - Test- / measuring results, FMEA - production- u. release. - Etc.	30
	Documentation of production planing	Day of creation	- Production concepts (implementation) - Control plan documentation - Appointment- and capacity planing	30
	Documentation for evaluating the production planning	Day of creation	- Lessons Learned - Prozess development - Planning for tooling - Etc.	10

These determinations do not replace statutory requirements.

Table according to VDA volume 1 documented informations and storage – current valid version is required.

4.2 Requalification testing (IATF16949 Section 8.6.2)

All products must be subject to re-qualification in the sense of IATF 16949 according to the production management plan / control plan. All products to be delivered to HB must be subject to annual re-qualification testing, if not otherwise agreed with HB. Re-qualification testing includes full dimensional and functional testing in consideration of the customer specifications to be applied for materials and function. The results must be documented.
For similar parts / products, one part from the product family can be sampled as representative for this family (product group). In the event of negative test results or deviations, the supplier shall immediately contact HB, determine a root cause analysis and initiate suitable remedial measures and document them.

4.3 Deviation approval (IATF16949 Section 8.5.6.1.1 / 8.7.1.1)

Approval must generally be obtained from HB before delivery for deviations from specifications. All deliveries made based on a deviation approval must also have labels on all load carriers and packaging.

4.4 Communication (IATF16949 Section 8.2.1)

HB expects that suppliers will be available for technical support in the course of meetings with customers, at their own location, or at HB's location.

Communication between the supplier and customers of HB related to HB products must be carried out exclusively in coordination with HB.

4.5 Contingency plans (IATF16949 Section 6.1.2.3)

Suppliers must identify and assess internal and external risks in all production processes and infrastructure equipment that are significant to maintaining production output. It must be ensured that all HB requirements are complied with.

A documented contingency plan is required, the following topics are mandatory:

- human resources
- machine resources
- material resources

If damage occurs, HB must be informed promptly.

4.6 Management of reworked or repaired products (IATF16949 Section 8.7.1.4 / 8.7.1.5)

The supplier must have installed a documented process for completing a risk analysis (e.g. FMEA) for product rework and repair.

All rework not included in the sampled production management plan (PMP) must be considered according to Section 1.1.3 “Changes to the product and process.”

HB must be informed using the Supplier request for technical approval (BAW) form. Written approval must be obtained from HB before implementation.

4.7 Handling nonconforming products (IATF16949 Section 8.7)

The supplier must introduce and apply a documented process for handling non-conforming products.
The supplier must ensure that a product that does not fulfill requirements and is to be scrapped is made unusable, unless otherwise agreed with HB. Suppliers must guarantee and ensure compliance with this process. Verification must be submitted to HB upon request.

4.8 Lessons Learned (IATF16949 Section 6.1.2.1 / 7.1.6/10.3)

The supplier must have installed and must apply a process for documenting and exchanging knowledge gathered through experience within the organization.
In order to ensure an efficient product and process development procedure, the supplier must use knowledge gained from earlier projects, complaints, audits, and/or rework.
During this process, the focus should be more on avoiding defects in the supply chain, rather than identifying them.v
The effectiveness of such measures will be verified through continual improvements of process stability in production, delivery quality and delivery performance.

4.9 Identifying customer property (IATF16949 Section 8.5.3)

All tools, production of testing materials that are owned by HB must be labeled.

4.10 Customer-specific requirements (IATF16949 Section 4.3.2)

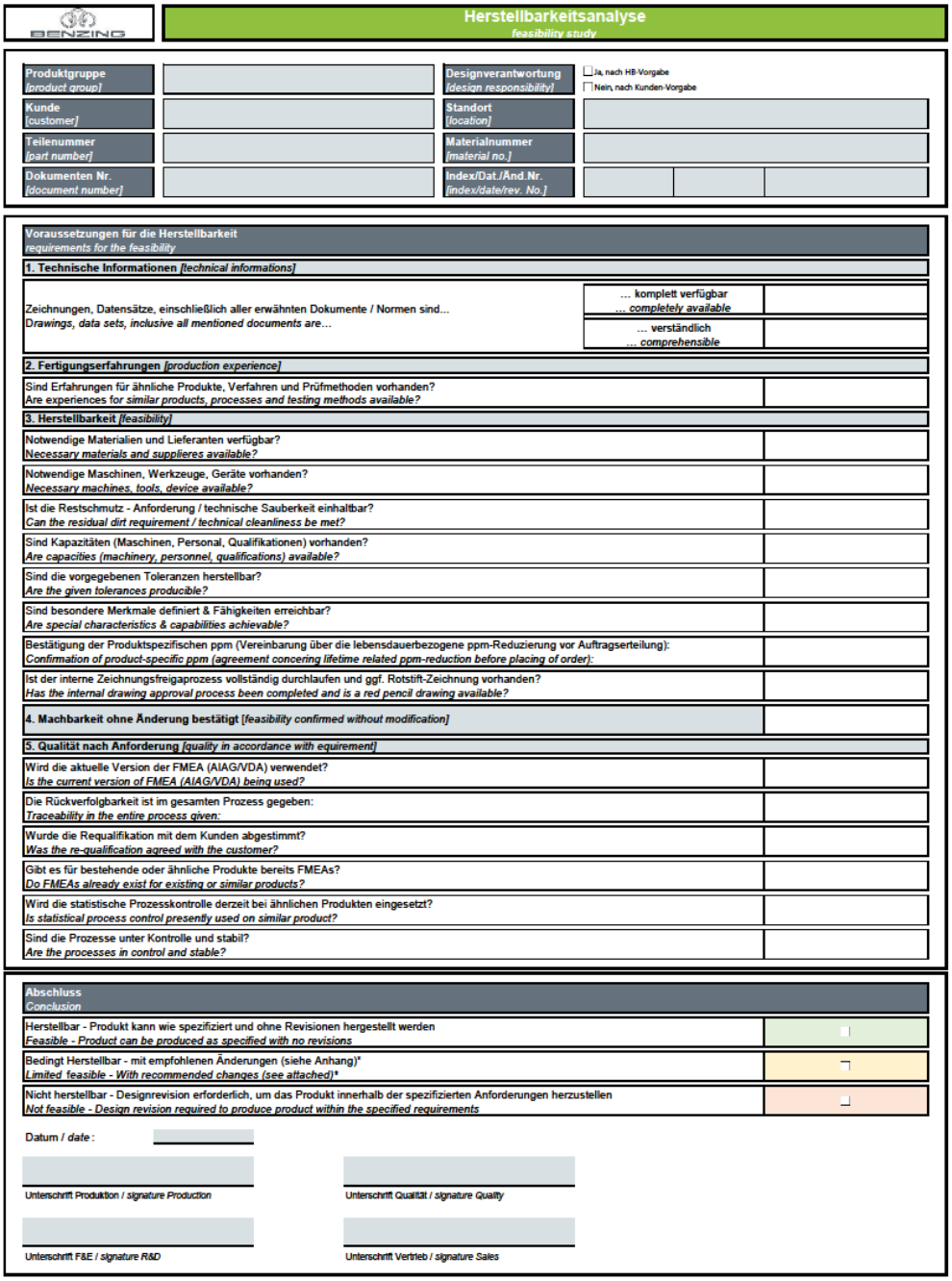
Suppliers are obligated to fulfill the specific requirements of HB customers.
General customer-specific requirements are already included in these guidelines and must be implemented accordingly. Additional customer-specific requirements of HB will be determined on a project-by-project basis. They are applied based on an agreement between HB and the supplier.

Section 5

Forms

The forms listed in the following section represent the HB standard, and include the minimum requirements. The supplier can use their own forms at any time if they fulfill these minimum requirements.

5.1 Feasibility analysis form



Herstellbarkeitsanalyse
feasibility study

Produktgruppe *[product group]*		Designverantwortung *[design responsibility]*	☐ Ja, nach HB-Vorgabe ☐ Nein, nach Kunden-Vorgabe
Kunde *[customer]*		Standort *[location]*	
Teilenummer *[part number]*		Materialnummer *[material no.]*	
Dokumenten Nr. *[document number]*		Index/Dat./Änd.Nr. *[index/date/rev. No.]*	

Voraussetzungen für die Herstellbarkeit *requirements for the feasibility*		
1. Technische Informationen *[technical informations]*		
Zeichnungen, Datensätze, einschließlich aller erwähnten Dokumente / Normen sind... *Drawings, data sets, inclusive all mentioned documents are...*	... komplett verfügbar *... completely available*	
	... verständlich *... comprehensible*	
2. Fertigungserfahrungen *[production experience]*		
Sind Erfahrungen für ähnliche Produkte, Verfahren und Prüfmethoden vorhanden? *Are experiences for similar products, processes and testing methods available?*		
3. Herstellbarkeit *[feasibility]*		
Notwendige Materialien und Lieferanten verfügbar? *Necessary materials and supplieres available?*		
Notwendige Maschinen, Werkzeuge, Geräte vorhanden? *Necessary machines, tools, device available?*		
Ist die Restschmutz - Anforderung / technische Sauberkeit einhaltbar? *Can the residual dirt requirement / technical cleanliness be met?*		
Sind Kapazitäten (Maschinen, Personal, Qualifikationen) vorhanden? *Are capacities (machinery, personnel, qualifications) available?*		
Sind die vorgegebenen Toleranzen herstellbar? *Are the given tolerances producible?*		
Sind besondere Merkmale definiert & Fähigkeiten erreichbar? *Are special characteristics & capabilities achievable?*		
Bestätigung der Produktspezifischen ppm (Vereinbarung über die lebensdauerbezogene ppm-Reduzierung vor Auftragserteilung): *Confirmation of product-specific ppm (agreement concering lifetime related ppm-reduction before placing of order):*		
Ist der interne Zeichnungsfreigaprozess vollständig durchlaufen und ggf. Rotstift-Zeichnung vorhanden? *Has the internal drawing approval process been completed and is a red pencil drawing available?*		
4. Machbarkeit ohne Änderung bestätigt *[feasibility confirmed without modification]*		
5. Qualität nach Anforderung *[quality in accordance with equirement]*		
Wird die aktuelle Version der FMEA (AIAG/VDA) verwendet? *Is the current version of FMEA (AIAG/VDA) being used?*		
Die Rückverfolgbarkeit ist im gesamten Prozess gegeben: *Traceability in the entire process given:*		
Wurde die Requalifikation mit dem Kunden abgestimmt? *Was the re-qualification agreed with the customer?*		
Gibt es für bestehende oder ähnliche Produkte bereits FMEAs? *Do FMEAs already exist for existing or similar products?*		
Wird die statistische Prozesskontrolle derzeit bei ähnlichen Produkten eingesetzt? *Is statistical process control presently used on similar product?*		
Sind die Prozesse unter Kontrolle und stabil? *Are the processes in control and stable?*		

Abschluss *Conclusion*	
Herstellbar - Produkt kann wie spezifiziert und ohne Revisionen hergestellt werden *Feasible - Product can be produced as specified with no revisions*	☐
Bedingt Herstellbar - mit empfohlenen Änderungen (siehe Anhang)* *Limited feasible - With recommended changes (see attached)**	☐
Nicht herstellbar - Designrevision erforderlich, um das Produkt innerhalb der spezifizierten Anforderungen herzustellen *Not feasible - Design revision required to produce product within the specified requirements*	☐

Datum / *date* :

Unterschrift Produktion / *signature Production*

Unterschrift Qualität / *signature Quality*

Unterschrift F&E / *signature R&D*

Unterschrift Vertrieb / *signature Sales*

erstellt: Drohomiretzki 02.11.2020
geprüft: Nappi 02.11.2020
freigegeben: Krauth 05.11.2020

FO0001.15_HB- Herstellbarkeitsanalyse

Änderungsstand
03.12.2021
Rev. Nr.: 1.0

5.2 Production management plan / control plan form

☐ Prototyp / Prototype ☐ Vorserie / Pre-launch ☐ Serienfertigung / Production Kontrollplan-Nr. / Control Plan Number	Ansprechpartner / Tel. / Key Contact / Phone Herr Dömötör / 0711-80006-38 Herr Nikolaus / 0711-80006-68	Datum (Erstellung) / Date (Orig.) XXXXX	Datum (Änderung) / Date (Rev.)
Teile-Nr. / letzter Änderungsstand / Part Number / Latest Change Level XXXXX	Projekt-Team / Core Team Herr Nikolaus / Herr Dömötör	Kunden-Konstruktionsfreigabe (falls gefordert) / Customer Engineering Approval/Date (if Req'd)	
Teile Bezeichnung / Part Name / Description XXXXX	Lieferant / Werksfreigabe / Datum / Supplier / Plant Approval / Date	Kunden-Qualitätsfreigabe (falls gefordert) / Customer Quality Approval/Date (if Req'd)	
Lieferant / Werk / Supplier / Plant HUGO BENZING / Stuttgart — Lieferanten-Nr. / Supplier Code	Zeichnungs-Nummer / drawing number / numéro de dessin XXXXX	Zeichnungsstand / drawing level XXXXX	

In case of doubt the German version is valid!

Teil / Prozeß-schritt-Nr. / Part / Process Number	Prozeßschritt / Arbeitsgang-Bezeichnung / Process Name/ Operation Description	Maschine,Vorrich-tung, Werkzeuge zur Fertigung / Machine, Device, Jig, Tools for Mfg.	Merkmale / Characteristics: Nr. / No.	Merkmale / Characteristics: Produkt / Product	Merkmale / Characteristics: Prozeß / Process	Besondere Merkmale Klassifiz. / Special Char. Class.	Methoden / Methods: Produkt / Prozeß Spezifikation / Grenzwerte / Product / Process Specification / Tolerance	Methoden / Methods: Meßtechnik / Evaluation Measurment Technique	Methoden / Methods: Stichprobe / Sample: Umfang / Size	Methoden / Methods: Stichprobe / Sample: Intervall / Freq.	Methoden / Methods: Prüfmethode / Dokumentation / Control Method / Documentation	Maßnahme(n) bei Abweichungen / Reaction Plan

5.3 Form 8 D Report

BENZING
SICHERUNGSRINGE | FORMFEDERN | PRÄZISIONSTEILE

8D-Report no.

Open date

Customer claim no.

Issuer

Receive date
Part no.
Part name
Customer part no.
Delivery note no.
Work order no.
Delivery date
Quantity delivered
Quantity rejected

Person in charge
Phone Email

Customer contact
Phone Email

D1 Team	
Team member	Team member
Team member	Team member
Team member	Team member

D2 Problem description

D3 Immediate measure(s)	**Date**	**Responsible**

D4 Root cause analysis

D5 Possible corrective action(s)	**Date**	**Responsible**

D6 Implemented permanent corrective action(s)	**Date**	**Responsible**

D7 Action(s) to avoid fault	**Date**	**Responsible**

☐ Update Process FMEA ☐ Not applicable
☐ Update Control Plan ☐ Update internal regulations
☐ Miscellaneous:

D8 Congratulate your team **Completion date**

5.4 Form Supplier request for techn. Approval (BAW)

☐ Änderungsantrag ☐ Sonderfreigabe

Sach-Nr.:		**Änderungsstand:**	
Bezeichnung:		**Datum:**	
Lieferant:		**Lieferanten Nr.**	
Name:		**Abteilung:**	
Stückzahl der betroffenen Teile:			

Änderungsgenehmigung (Teil / Spezifikation soll zukünftig geändert werden; Sind bereits veränderte Teile vorhanden, ist zusätzlich die Sonderfreigabe zu beantragen)

☐ **Konstruktion** ☐ **Ausführung** ☐ **Fertigungsprozess** ☐ **Herstellungsort** (Produktionsverlagerung) ☐ **Werkzeug**

Sonderfreigabe (Antrag auf Sonderfreigabe; Ist zukünftig eine Änderung des Teils oder einer Spezifikation notwendig, ist zusätzlich die Änderungsgenehmigung zu beantragen.)

Beschreibung / Begründung der Abweichung (mit Ursachen und Maßnahmen)

Rechtsverbindliche Unterschrift des Lieferanten-Beauftragten

Datum	Abt./Name	Unterschrift	Telefonnummer

Hinweis:
Diese Genehmigung entbindet den Lieferanten in keiner Weise von seiner vertraglichen Verpflichtung, alle nicht von dieser Änderungsgenehmigung/Sonderfreigabe betroffenen Merkmale oder Produkteigenschaften einzuhalten, die in Lastenheft / Spezifikationen und/oder anhand bereits früherer getesteten oder genehmigten Mustern festgelegt sind. Der Lieferant trägt die Verantwortung für die beantragten Änderungsgenehmigungen bzw. Sonderfreigaben, wenn die ursprünglich genehmigte Funktion und/oder Eigenschaften des Produktes negativ beeinflusst wurden.

Vom Kunden auszufüllen

Genehmigungsverfahren		**Bearbeitungsnummer:**	
Zustimmung des Endkunden erforderlich	☐ Ja	☐ nein	Wenn ja, Zustimmung erteilt ☐ ja ☐ nein

Freigabe erteilt? ☐ Ja (befristet,unbefristet) ☐ Ja, mit Auflagen (befristet,unbefristet) ☐ Nein, Begündung

Auflagen oder Begründung bei Ablehnung

Befristet auf: Zeitraum: Menge:

Konstruktion/Technik			
	Datum	Abt. / Name	Unterschrift
Produktion			
	Datum	Abt. / Name	Unterschrift
Qualitätssicherung			