Quality Capability Suppliers Assessment Guidelines

Potential Analysis
Self Audit
Process Audit, Product Audit
Mandatory Documentation (D/TLD-Parts)
Technical Revision Suppliers
Problem Analysis
Sub-Contractor Management

Formel Q-Capability contains agreed contract requirements for the Companies of VOLKSWAGEN GROUP to assure the quality of processes and also products of the procurement and supply chain.
4.1 Additions/changes to edition 4 (online in B2B Platform)

This brochure will only be available to suppliers in the current version electronically through the Volkswagen Group B2B-Platform under www.vwgroupsupply.com.

Up to date valid and mandatory documents are located at the aforementioned B2B platform.

The original German language edition of the Formel Q Capability is the original version. In cases where further clarification is required the German version takes president.

Proprietor Volkswagen AG

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Issued: Volkswagen AG
Group Quality Procurement
Group Quality Supplier Audit
Letterbox 1467/0, 38436 Wolfsburg
The customer specific quality requirements of the Volkswagen Group are specified in the Formel-Q volumes as shown below.

**Figure 1: Quality Management Agreements Purchased Parts**
Supporting documents in the latest edition

**Group Quality Documents on** [www.vwgroupsupply.com](http://www.vwgroupsupply.com):

- Actual information for the requirement of field rejects for the brand VOLKSWAGEN PKW
- Formel Q-Konkret
- Formel Q-Capability Software
- Formel Q-New Parts Integral
  
  Volkswagen Group Form: Supplier Self Information
  
  Volkswagen Group Form: Manufacturer Code for vehicle parts (VW10540)

**Group Standards Register on** [www.vwgroupsupply.com](http://www.vwgroupsupply.com) (FE Online Normentexte):

- High tensile fasteners, bolts and nuts (VW 60250)
- Machine capability studies for measurable characteristics (VW 10300)
- Process capability studies for measurable characteristics (VW 10131)
- Inspection process capability – consideration of measuring inaccuracy on inspection processes (VW 10119)
- Interdisciplinary requirements for services provided for the parts development (VW 99000)
- Identification marks/ manufacturer code on vehicle components (VW10540)
- Sub-component identification – Codes on vehicle components (VW01064)
- Bought-in components, approval of initial deliveries and changes (VW 01155)

**VDA-Volumes and automotive standards on** [www.vda-qmc.de](http://www.vda-qmc.de):

- The current versions are supplementary, as far as they are not already covered by the Formel-Q volumes, Volkswagen standards and the technical delivery standards:
  
  - VDA-Volumes 1-7 and 18
  - Product Development – Completion status assurance for New Parts
  - Product Manufacturing - and delivery – Robust Production Processes,
  - Component Engineering Specifications – Automotive Standard Structure
  
  - actual Version ISO/TS 16949 and DIN EN ISO 9001

**Supplementing Guidelines:**

Guideline for the auditing of quality assurance systems – conducting audits (DIN ISO 19011)

Additionally, the technical standards and Volkswagen Standards applicable for products are valid as well e.g. min. life time of products, laws, regulations, guidelines etc. are applicable.
Foreword

Increasing customer requirements, global competition and the pressure of costs are demanding matured products for serial production launches and robust production processes for failure prevention along the supply chain. For this challenge we have to stand together, in order to succeed with our products in the market and to secure our future success.

Our suppliers and their supply chain are a high priority.

Each process is to be designed preventively robust and stable, to ensure, prior to serial production launch, that every component and also the whole vehicle will meet the Volkswagen Group quality requirements. Only working in this way will ensure that the zero-defect-target will be met.

With this, customer satisfaction is especially in the focus of attention.

In order to prevent difficulties during the launch of new models, the maturation status of the whole supply chain is of primary concern. The maturation status, in the future, will be more intensively analysed by Volkswagen Group.

This Edition No. 6 provides completely revised contents, updates and improvements in conjunction with the additions to the “Formel-Q Konkret”.

Relevant modifications and additions were made to the following contents:

- The Chapter Overall Assessment of the quality capability (chapter 7) has been updated by the addition of the hurdle principle. This includes the adaption and marking of the *-questions (questions of special significance).
- The topic Customer Requirements and Cost Reclaiming has been confirmed. (chapter 2).
- The new chapter 11 has been added to strengthen the Volkswagen Group requirements along the supply chain. The goal is to reduce the risk and have early transparency in the supply chain.
- The TRL questionnaire has been updated on the contents (chapter 16 and 10).
- The mandatory D/TLD self audits, are now to be entered into the online sampling programme on the BeOn system (chapter 8 and 15).
- Since the QM-System-Assessment is covered in VDA Volume 6.1 further information is not made in this document.
- By the introduction of the VDA Volume “Product Development – Maturation Grade Assurance for New Parts” in combination with “Formel-Q Integral”, the VDA 6.3 Part A catalogue of requirements will continue to be valid. It however will not be displayed in chapter 14 of this brochure (catalogue requirements for process audits).
- In the catalogue of requirements for Process Audits (chapter 14) the questions 1.1 and 3.1 have been updated in aspects of sub-contractor assessments and in question 2.3.1 the risk assessment of outsourced manufacturing processes is given more significance.
This Formel-Q Capability is the guideline for the assessment of the Quality Capability of our suppliers and the supply chain from direct suppliers (1st tier suppliers) for Volkswagen Group. It is essential that you as a direct supplier will ensure, that the Volkswagen Group requirements along the supply chain will be fully understood and implemented.

The Formel-Q Capability is binding for all direct suppliers (Volkswagen Group Suppliers) and also to their sub-suppliers of products and materials, which will go onto the vehicle (suppliers for production materials). It is compulsory for all Companies of the Volkswagen Group, and as well for the associated companies worldwide.

To improve communication and optimize the business relation team concept with our suppliers we created the Volkswagen B2B forum. Under www.vwgroupsupply.com you can find additional multilingual information and you are requested as our supplier to keep your supplier information up to date.

Wolfsburg, August 2009

F. J. Garcia Sanz               J. Rothenpieler
Board member of Corporate-Procurement   Head of Corporate Quality Assurance
VOLKSWAGEN AG                      VOLKSWAGEN AG
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1. Introduction

1.1 Purpose

The evaluation system for the quality capability of Volkswagen group suppliers is based on a quality standard for the automotive industry that was developed by the VDA / DGQ expert group.

According to this quality standard, the QM-System according to ISO/TS 16949 and VDA 6.1 is the basis for suppliers of production material, and the fulfilment of the requirements must be proven to the Volkswagen group by an IATF recognised certificate (third party).

In addition to the quality management system certificate, a process/product audit that is comparable to VDA 6.3 / 6.5 is used for special product groups to assess the quality capability of suppliers. Apart from the basic requirements of a QM system, it also considers the special product-related requirements of Volkswagen purchased parts, the production process, and special technical inspection requirements.

The Potential Analysis and the Process Audit facilitates the evaluation and the selection of suppliers by a Volkswagen Group Auditor prior to awarding of business (nomination) as well as the qualification of series suppliers. The aim of the qualification measures is, to ensure, that initial processes and procedures during the launch of serial production and also during actual serial production will be without any defects. The delivery quality and function of products must comply with Volkswagen Group customer requirements. Adherence to important customer relevant product characteristics and all customer requirements at the sub-contractors is of particular significance.

A systematic and regular failure and process analysis must be conducted by the supplier, which leads to the introduction of continuous improvement programmes. This fundamentally has product and cost optimization as a goal due to the improved processes and procedures.

Compliance with the basic requirements according to ISO/TS 16949 or VDA 6.1 Part 1 must be verified through certification (third party). However, the process / procedure steps for Volkswagen Group products and adherence to important product characteristics are audited exclusively by the auditing teams of the Volkswagen Group or Volkswagen’s associated companies.

The purpose of self-assessment by the suppliers is to assure compliance with the Volkswagen Group specific product and process requirements (SA=Supplier Self-Assessment see section 4) per Formel-Q Capability requirements.

The evaluation result provides information on the quality capability of the suppliers for individual product groups. It shows to what extent the processes are complying with the specific requirements and specifications for purchased parts (bought-in parts) of the Volkswagen Group.

The evaluation of a supplier always corresponds to his quality performance and quality capability. A positive supplier assessment is based on quality capability and quality performance of a supplier at a specific supplier location (see the following diagram) and is a condition for the product pre-sourcing decision at Volkswagen Group (CSC: Corporate Sourcing Committee).
1. Introduction

Supplier evaluation for manufacturing location and product groups of the supplier within the Volkswagen Group – Quality Capability (QC) / Quality Performance (QP):

Supplier Evaluation in Volkswagen Group
(Evaluation of QC and QP for each manufacturing location)

Quality Capability
- Results Process Audit
- Process Capability (SPC, Cpk)
- Machine Capability
- Results of the Product Audit
- Continuous Improvement Process – (CIP)
- Logistic Concepts
- Customer Complaints/ Satisfaction
- Sub-Supplier Management
- Quality Management System
- ...

Quality Performance
- Product Development
- Prototyping
- Sampling / Release Process
- Serial Production
- Concern Management / 8D
- Reaction Time / Sustainability /
  Effectiveness / ppm / HSF
- Market (Field)
- Fault Correction Process (FCP),
- Technical Factor (TF),
- Concerns/1000 Vehicles ,
- ...

Figure 2: Supplier Evaluation – Quality Capability (QC) / Quality Performance (QP)

1.2 Requirements for Quality Capability Assessments

The quality capability of selected suppliers and their sub-suppliers, must always be proven before a purchase order for a new part (forward sourcing) or for a series part (global sourcing) is placed.

The proof can be submitted by self-certification and audit of the suppliers plus supplementary audits to be carried out by the responsible departments in the VW Group, using the potential analysis or the process audit.

New proof of the quality capability is also required if a new product according to the product group catalogue should be delivered, if previously no audit of the quality capability has been performed by the Volkswagen Group.

VW Group Purchasing must ensure that the intended supplier has already been informed of all Volkswagen Group criteria and requirements and has access to the B2-B Supplier System (www.vwgroupsupply.com). They are to be referred to by the supplier for calculation of the quotes. With the release of the access to the B2B-Supplier Platform, the supplier must complete and maintain the supplier database for each DUNS-number.

Should a supplier face any difficulties during the Registration Process (Access Release) and / or while navigating on the B2B-Portal, he can contact the Supplier Integration Team (SIT) via telephone the B2B-Helpdesk of the Volkswagen Group on +49-5361-9-33099 or by email on SupplierIntegration@VWGroupSupply.com.
1. Introduction

Before an order is placed, a quality capability rating of “A” or “B” for a supplier must be awarded. A supplier with “C-Rating” (not quality capable) will not be considered for nomination. The target is a quality rating of “A” before SOP.

Changes to processes and equipment as well as changes of sub-contractors must be communicated to the Volkswagen Group receiving plant and to the affected Volkswagen Group auditing department. A new assessment of the quality capability and, if necessary, a new initial sample order can be subsequently conducted (see also VDA Document 2 “Ensuring the quality of deliveries”).

The Volkswagen Group procurement process, starting with product inquiries at a supplier (RFQ) until the nomination process of Volkswagen Group (CSC Process), is illustrated in a simplified way, on the following flow chart.
1. Introduction

Figure 3: Schematic Diagram purchasing parts inquiry (RFQ) until nomination
1. Introduction

1.3 Responsibilities for QM-System and Audit Results

Suppliers are required, to provide all results from certification/auditing, as well as self audits, to Volkswagen, when requested. Also to be presented are documents from Improvement Programmes already implemented.

If ISO/TS 16949 or the VDA 6.1 certification is not awarded to the supplier, a confirmed planned certification date is to be advised. Further progress is to be coordinated in detail with Volkswagen Group Quality Assurance’s Audit Management.

The coordination and communication for required follow-up actions, e.g. pursuing improvement programmes, takes place via Volkswagen Group Supplier Quality or the individual brands/affiliated companies audit departments.

1.4 Assessment Quality Capability

The total assessment of the quality capability is divided into individual results for each product group for:

- Self Audit
- Process Audit with Product Audit
- Evaluation of the supply chain, e.g. for outsourced process steps

For the Quality Audit question/requirements catalogues (see chapter 14 “Requirements Catalogue” for Process Audits) are used. The individual requirements will be adjusted with the supplier during the audit. Significant characteristics are considered during the product audit.

Potential Analysis, Process Audit, Product Audit, Self Audit and the assessment of the sub-suppliers will contribute to the total score for quality capability of Volkswagen suppliers. In case of existing or applicable certificates/QM-System-Audit results prepared by third parties, the total evaluation is based on the catalogue of requirements (Potential Analysis/Process Audits) in use and the related specifications, as well as down-grading criteria.

The rating of the quality capability is based on product groups (e.g. controllers, decorative parts, steering systems) with process steps, punching, drawing, bending/heat treatment/moulding (plastics)/assembly/painting.
1. Introduction

Interfaces and topics of different audit types

Figure 4: Interfaces and topics of different Audit types

1.5 Audit Ratings and Follow up Activities

Improvement measures are normally agreed and scheduled with the supplier on the basis of the audit result. It is expected that the supplier introduces the required measures and that the Improvement Programme is implemented immediately.

The supplier is required to show the agreed improvement measures and their implementation to the VW Group auditor, who then decides whether a re-audit of the suppliers’ production is required. A supplier can only be released for series deliveries if the shortcomings that were pointed out in the Improvement Programme have been eliminated in line with the deadlines, the start of production (SOP), and if the relevant requirements are complied with. After completion of the Improvement Programme the realisation should be proven through a self-assessment by the supplier.

A new Process and Product Audit, Problem Analysis or Technical Revision by VW Group is required for unacceptable quality performance of the supplier. With the supply of new products / product groups by the series supplier, a new audit is required (see the following flow chart).
1. Introduction

Flow Diagram of rating results and follow-up activities

Figure 5: Rating results and follow-up activities
2. Customer Expectations / Escalation / Cost Reclaiming Process

2. Customer Expectations / Escalation / Cost Reclaiming Process

2.1 Customer Expectations

The Volkswagen Group requires its suppliers to target to achieve an “A” Rating according to the Formel-Q Capability. The implementation of a continuous improvement process (see also Formel Q Konkret 4.5) and the follow-up of the zero-defect strategy are the basic elements for such a process.

The evaluation of the Volkswagen Group Customer satisfaction and the active introduction and follow-up of improvement measures are required as an elementary part of regular management reviews.

Should measures and improvement programmes, which were required by Volkswagen Group, not be implemented timely and adequately, and repeated defects occur, the Escalation Principle (Programme Critical Serial Supplier) will be initiated.

2.2 Cost Reclaiming Process

A cost reclaiming process will be initiated, if a supplier causes additional expenses in the form of travel costs and daily expenses for the Volkswagen Group Auditors that have been incurred by Volkswagen Group, and where the results of the Audit do not confirm the results of the supplier (target not met). The “Cost Reclaiming Process” will be applied depending on the daily expenses incurred (number of man days of the Volkswagen group Auditors at the supplier) and will include the travel costs as a fixed amount for domestic travelling and for travelling abroad.

The Cost Reclaim Process for the expenditure of Volkswagen Audits is foreseen for:

- If due to the unacceptable reaction time of a supplier to Volkswagen Group Process Audit or a Problem Analysis is required.
- If delivery or quality issues of the supplier at our receiving factories lead to unscheduled, extra Volkswagen Group Audits or Problem Analysis.
- If an unrealistic self audit (A Rating) by the supplier takes place, which cannot be confirmed by the Volkswagen Group Process Audit.
- If the A Rating will not be achieved within a reasonable time frame, and therefore an additional Volkswagen Group Process Audit is required.
- If a supplier relocates already sourced or existing supply contents to another manufacturing site, different from the one declared on the “Nomination Letter” (Order), and therefore a new assessment of the new manufacturing site will be required.
- If significant / important process changes and also change of the supply chain or outsourced process steps occur, which require a new sampling process and/or assessment of the quality capability.
- If during any activity according to Formel-Q Capability e.g. during a TRL, the need for immediate corrective actions is identified or the TRL is rated with status “Red”, then the travel costs and other resulting costs can be charged to the supplier.

Volkswagen reserves the right, to conduct Process and Product Audits at any time at a supplier for critical projects and unacceptable reaction time of the supplier.
3. Potential Analysis

3.1 General

The Potential Analysis primarily is used for the evaluation of unknown markets and if required for the assessment of the development and process potentials of the applicant in preparation for the nomination process. The Potential Analysis takes place with involvement of experts from various business areas of Volkswagen Group, to determine the technical and organisational potential of a supplier manufacturing site at short notice and with minimum effort. With the evaluation of several supplier analyses from one region, information about region / market specific strengths and weaknesses is provided.

The audit team will be set up from experts of Supplier Quality and Development audit as well as, if required experts from affected areas e.g. procurement, logistics, and QS-Purchasing, of the receiving plants.

The Potential Analysis refers to procurement of specially nominated parts and defined processes. The experience of the supplier with similar products and the potential of core processes for product realisation will be evaluated.

To ensure an analysis that is systematic and reproducible a catalogue of requirements for Potential Analysis will be used. The questions / requirements not applicable during the audit will be excluded and do not score on the assessment.

The Potential Analysis is divided into two relevant sections for the assessment:

1. For the manufacturing process – “Process” – (Eₚ) Evaluation by accredited Auditors of Volkswagen Group Quality Assurance (Chapter 3.2)
2. For product development process – Product Development/- Design– (Eₑ) Evaluation by Volkswagen Group Development Auditors (Chapter 3.3)

The Potential of Product Development is evaluated according to an additional catalogue of requirements for Development “Component Related Assessments of Development Partners”. This catalogue of requirements is the foundation for the evaluation by Volkswagen Group Auditors within the framework of Potential Analysis. Further explanations of the catalogue of requirements can be found on the B2B-Platform (www.vwgroupsupply.com) among documents for research and development.

3.2 Auditing and Assessment of "Process" by Group QS Auditors

The Potential Analysis “Process” is defined as obtaining and evaluating the potential for products defined by procurement, the capability of processes and process flow as well as compliance to customer requirements and expectations.

The following topics (assessment paragraphs) will be verified at the supplier’s manufacturing site and at the development centre.
3. Potential Analysis

Assessment sections for the evaluation of “Processes” are:

1. Compliance to the Requirements for the Product (significant characteristics)
2. Experience / References
3. Process Development Potential / Project Planning
4. Facilitated Q-Methods / Q-Techniques
5. Bought-in Material / Purchased Products (Supplier Qualification)
6. Customer Care / Customer Satisfaction (Service)
7. Production (all Process Steps),
   Processing Facilities (Machinery/Equipment),
   Quality Assurance Measures
   (capability ability & evidence, forced control, securing parameters),
   Flexibility of manufacturing equipment, and inspection technology, faulty
   units / corrections, work environment layout, and Job descriptions
8. Process Standards / Quality
9. Material Flow / Logistics

The scoring of individual questions for specific assessment elements is to be according to the following evaluation scale:

<table>
<thead>
<tr>
<th>Scoring Points</th>
<th>Assessment for fulfilment of individual requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>Requirements <strong>fully</strong> met</td>
</tr>
<tr>
<td>8</td>
<td>Requirements <strong>mainly</strong> met *) ; Minor deviations present</td>
</tr>
<tr>
<td>6</td>
<td>Requirements <strong>partially</strong> met ; Major deviations present</td>
</tr>
<tr>
<td>4</td>
<td>Requirements <strong>unacceptably</strong> met, Critical deviations present</td>
</tr>
<tr>
<td>0</td>
<td>Requirements <strong>not</strong> met</td>
</tr>
</tbody>
</table>

*) Majority means in this regard that more than approx. ¾ of all the requirements have effectively been proven and that no special risks exist.
3. Potential Analysis

The calculation for the grade of fulfilment for processes (Eₚ) comes from the achieved results of evaluated elements for all of the production steps:

\[ Eₚ [\%] = \frac{\text{Total of the degrees of fulfilment of all evaluated elements}}{\text{Number of evaluated elements}} \\% \]

\[ Eₚ := \text{Grade of fulfilment "Process"} \]

3.3 Auditing and assessment of product development process by group development auditors.

The Potential Analysis “Product Development Process”, is a product related assessment of development partners. Design and layout of the related questionnaires is the responsibility of the member of the Volkswagen AG Board of Directors for Design.

Assessment elements are:

1. Specifications and Standards
2. Design and Simulation Systems
3. Design Capacities and Competencies
4. Innovation in Technology and Product
5. Testing, Laboratory and Measuring Technology
6. Testing / Prototyping
7. Project Competence / Communication
8. Methods of Product Development

Evaluation of the individual criteria is to be conducted according to the development assessment sheet (catalogue of requirements for development “Product specific Assessment of Development Partners”). Further explanations related to the catalogue can be found on the B2B-Platform: (www.vwgroupsupply.com) under Research & Development documents.

The grade of fulfilment \( E_{DE} \) is calculated as followes:

\[ E_{DE} [\%] = \frac{\text{Sum of all achieved points}}{\text{Sum of all possible points [260]}} \times 100 \% \]

\[ E_{DE} := \text{Grade of fulfilment product development (design)} \]
3. Potential Analysis

3.4 Total Evaluation

The rating for E\textsubscript{P} and E\textsubscript{DE} will be determined individually. The overall evaluation according to rating A, B, or C is, according to the hurdle principle, always the lower individual rating.

The grade of fulfilment E\textsubscript{P} and for Design E\textsubscript{DE} will be combined to determine the overall rating.

The rating of a company will be performed according the following scoring system.

Rating Scale:

<table>
<thead>
<tr>
<th>RATING</th>
<th>Degr. Of fulfilment E\textsubscript{P} [%]</th>
<th>Degr. Of fulfilment E\textsubscript{DE} [%]</th>
<th>Determination regarding the purchase order decision</th>
<th>Determination</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>at least 92</td>
<td>at least 90</td>
<td>Can be used</td>
<td>without any series individual weaknesses</td>
</tr>
<tr>
<td>B</td>
<td>82 – 91</td>
<td>75 – 89</td>
<td>Can be used with conditions</td>
<td>improvement / investment programme can be implemented by the start of the development / SOP</td>
</tr>
<tr>
<td>C</td>
<td>0 – 81</td>
<td>0 – 74</td>
<td>Cannot be used</td>
<td>Implementation of an improvement / investment programme by the start of the development / SOP cannot be foreseen/cannot be fulfilled</td>
</tr>
</tbody>
</table>

Downgrading:

Although a higher degree of fulfilment is rated, downgrading to C will be applied if:

- the improvement / investment programme is not foreseeable / not fulfilled for individual criteria by the start of the development / SOP. This is noted in the audit report.
- Additional reasons for the downgrading are described in section 7 “Overall Evaluation” of the quality capability rating as well as in Formel Q Konkret.

Further reasons for downgrading to B or C, as explained in section 6, also apply here. The result of the Potential Analysis for a specific actual product inquiry is valid for the overall specific product group. An improvement programme that might be necessary is coordinated with the audited company on the date of the audit. The auditing team specifies the deadlines for the implementation and deadlines for the follow-up activities. The Supplier Quality Group department monitors the improvement programme and the initiation for a subsequent audit where necessary through the responsible auditor.

A Process / Product Audit according to section 5, 6 must always be carried out by the “Start of Production” (SOP). The A Rating should be the goal. Even in the event of a rating “Not qualified” (C-Rating), the audited company is requested to correct the weaknesses that have been found and to report the implementation of the improvement actions to the evaluation team, so that the improvements can be considered for future purchasing order decisions.
3. Potential Analysis

Potential Analysis (Flow Chart)

<table>
<thead>
<tr>
<th>R: Responsible</th>
</tr>
</thead>
<tbody>
<tr>
<td>S: Support</td>
</tr>
<tr>
<td>I: Information</td>
</tr>
</tbody>
</table>

Potential Analysis (PN)

Start

Decision to conduct a Potential Analysis

Visit Preparation/Registration

Conducting PN (Potential-Analysis)

3.2 Assessment Q

3.3 Assessment TE

Results presented locally at Supplier

Result of Assessment

“X” or “Y” (qualified)

Decision for Proposal

Conduct Process and Product Audit

End

Input

Output

Supplier Self Information

Information

Formal Q Capability / TE Questionnaire

PN Report / Improvement Programme (IP)

PN Report / Improvement Programme (IP)

VW Group Data Server

Formal Q Capability (Section 5 and 6)

Figure 6: Flow Chart Potential Analysis
4. Supplier Self Audit (SL)

4.1 General

The self audit at the supplier is required as proof of compliance with all requirements (legal, regulatory, customer and product specific, internal specs and guidelines and standards of the certification requirements from VDA 6.1 or ISO/TS 16949) for the individual manufacturing site of the specific product.

The supplier self audit is part of the continuous improvement process and has the purpose to achieve the “A” Rating. A self assessment with an “A” Rating will be validated by Volkswagen Group by a VW Group Process and Product Audit (for further details - see flow chart!).

The target is, that the supplier’s manufacturing site will at least, after the 2nd self audit, achieve the “A” Rating. Should an “A” Rating not be achieved by the self audit in a timely way, Volkswagen reserves the right, to conduct an audit at the supplier anyway. If the requirement of the “A” Rating is not met by the self audit of the supplier for reasons which are the responsibility of the supplier, the costs for the Volkswagen Group Audit will be charged to the supplier. Further cost reclaiming details – see section 4.3.

4.2 Realisation

The internal audit must be conducted by qualified (ISO 19011) auditors.

The supplier is responsible, as part of the self audit, to internally verify the adequacy of the improvement programme. Volkswagen Group expects the supplier self audit to cover more than just identified areas of concern from the improvement programme, otherwise it will not be valid.

The self audit is to be conducted the same as a Process Audit according to section 6 along with a Product Audit according to section 5. Also the supply chain is to be assessed and documented with the self audit as well (see section 11). For the overall assessment of the quality capability the guidelines will be according to section 7 including the hurdle principle where the star questions apply.

Volkswagen Group requires suppliers of Volkswagen Group to conduct at least 1x annually a self audit for all process steps for the product groups relevant to Volkswagen products. The self audit must be conducted on the Volkswagen Self Audit form (see attachments). It is possible to download the self audit as an Excel file from the B2B-Portal. The self audit is to be submitted to the customer upon request.

4.3 Escalation

The Escalation Process according to Formel Q Konkret, for failing to meet customer requirements, is defined in section 4.11 (Programme for “Critical Serial Suppliers”). Volkswagen reserves the right for critical projects and unacceptable reaction time from the supplier to conduct Process and Product Audits at any time. Reasons for the cost reclaiming process of Volkswagen Group's costs for audit activities are explained in section 2.2
Figure 7: Self Audit (SL)
5. **Product Audit**

5.1 **General**

Process variations and low process capabilities tend to have an effect on the product quality and consequently the compliance with the customer requirements. In a Product Audit, it is possible to determine deviations from the customer requirements and to directly draw conclusions with regard to the influencing process. Taking the detected deviations into account, it is possible to investigate and analyse the influencing processes in a prioritised manner and to implement corrective action.

Along with the Process Audits at supplier’s production site Volkswagen conducts Product Audits in a prioritised manner to evaluate important product characteristics from the viewpoint of the customer and to identify critical processes. The task of the Product Audit is to inspect products that are ready for shipment in terms of their compliance with the specified customer relevant characteristics, to draw conclusions with regard to the parts / as-delivered quality, to trace deviations back to the defects in the process that cause them and to initiate corrective action when necessary. (see also VDA volume 6 Part 5; Formel Q Konkret).

5.2 **Execution and actions**

The Volkswagen Group Product Audit is performed together with the Process Audit and refers to a few important characteristics that must be defined in consultation with the supplier. The characteristics are selected in a risk orientated manner according to possible fault categories A and B (see table). With the evaluation of the Product Audit the previous product audit results will be taken into account. It is not possible to include long-term testing in the audit. The latest result that the supplier can provide regarding these products can be used in this regard, if necessary. The most important characteristics can refer to, for example:

- Characteristics that deviate from the customer requirements
- Complaints from the past
- Dimensions (initial measurement, function, assembly)
- Material
- Function
- Visual appearance, haptic
- Product Identification

Prior to the shipping of completed products with identified problems category A or B, immediate improvement action (production stop / sorting with 100% testing and immediate communication to the factory receiving locations by the supplier)is required to eliminate the possibility that faulty products are supplied. Required corrective actions are to be implemented immediately.

In the case of category C defect faults the required actions are to be agreed upon immediately with the Quality department of the factory receiving locations.

For the execution of the product audit, an up to date production batch that was recently produced or parts thereof must be available so that the quality of the
5. Product Audit

current process can be traced. The parts for the inspection are taken directly from the warehouse or before shipment from the original packaging for the customer.

The quality of the container, cleanliness and packaging are also evaluated, however are not included in the product audit evaluation, but referred back to the Process Audit and integrated in the relevant evaluation.

The sample size for the parts in the Product Audit depends on the product complexity and previous experience. The target and the actual values are recorded and evaluated - (see appendix for forms)

Should there be any deviations away from the customer specification identified, immediate action such as sorting of stock, quarantining of parts, required special action at the customer, is to be initiated. Such action must be started immediately.

During the inspection, the quality and functional capability of the test, inspection and measurement equipment is also evaluated and to be considered in the Process Audit. Corrective actions must be agreed upon if any deviations from the customer specifications are identified. Quality ratings (KPI's) are not calculated, they are subject to the internal Product Audits of the supplier - (see VDA 6.5).

If any faults occur, these are taken into account for the evaluation on the process audit. A downgrading can result from the Product Audit result (see section 7: total evaluation of quality capability).
### 5.3 Fault Classification, Decisions, Actions

<table>
<thead>
<tr>
<th>Fault Category</th>
<th>Fault description/ effect</th>
<th>Immediate action</th>
<th>Follow-up action</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Fault will certainly result in customer complaints. - Safety risk, violation of legal regulations, breakdown, - Product cannot be sold / function not fulfilled - extreme surface appearance complaints</td>
<td>- Quarantining / Sorting of available stocked parts - Information to receiving plants and risk assessment - Corrective actions on the manufacturing / inspection process &amp; if necessary 100% inspection; - Intensified inspection on processes and on finished products; if necessary 100% inspection before shipment;</td>
<td>- Continued analysis of process / inspection activities - Development &amp; implementation of corrective measures - Proving of Process Capability and zero defects - Effectiveness verification for implemented measures - If necessary change of specification to be initiated.</td>
</tr>
<tr>
<td>B</td>
<td>Customer annoyance or complaints can be expected - Foreseeable failure - reduced usability</td>
<td>- Permit requested from Engineering - Further measures to be agreed with VW Group receiving plant (see Formel Q Konkret 4.4.1)</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>Complaints from demanding customers can be expected - defects, that do not have influence on the usability of the product or the functionality</td>
<td>- Information to receiving plants for coordination of measures</td>
<td></td>
</tr>
</tbody>
</table>

Figure 8: Corrective Action Classification Process, Decisions, Measures
Figure 9: Product Audit
6. Process Audit

6.1 General

The Process Audit is carried out in order to evaluate / measure the quality of processes and procedures of product and process development procedures, suppliers / purchased material, the individual process steps for the product manufacturing process as well as the fulfilment of all customer requirements to the full customer satisfaction (details see section 13, catalogue of requirements for Process Audits).

In the Process Audit the coordination and adherence of the process and procedure quality is evaluated in conjunction with controlling documents and standards (e.g. control plan, operator, process and instructions, mixing instructions, technical product / process standards, customer and legal requirements etc.).

The Process Audit focuses on the requirements for specially selected parts and on the related manufacturing processes, including if applicable the process steps outsourced at sub-contractors (see section 11: “Sub-Supplier Management”). The foundation for the Process Audit is the VDA 6.3 standard with Part B for Serial Production with the assessment of all processes and procedures in current production. See catalogue for Process Audit in section 14.

The key points of the audit are the timely planning and qualification of products and processes of Volkswagen parts as well as continuous improvement (CIP) on all process and procedure steps. The qualifications of the personnel and their responsibility in the process are of particular importance.

Insufficient compliance can call into question the existing certification of the QM-System and could lead to an evaluation result “Business on hold” by Volkswagen Group (see Formel Q Konkret section 2 and 4.11).

In the Process Audit all previously known problems of the product and process (quality performance) along with the supplier chain will be looked at and the current process capability of significant / relevant characteristics will be evaluated. (see also section 5 “Product Audit”).

For a systematic and reproducable analysis the list of requirements for the Process Audit (see section 13) is used. The questions not applicable at the time of the audit are to be excluded and do not enter the assessment. Those questions are to be marked as “NA”.

6. Process Audit

6.2 Process Audit in Serial Production

The Process Audit in serial production assumes a completed production development process (product / process development) and takes, with a strong focus on customer satisfaction, the associated processes into account.

It is presumed that the full realisation of defined measures after completion of the product development process is completed and will be verified during the audit.

The audit in serial production without process development can take place before start of serial production (SOP) or during the whole period of the production process.

For process observations and process improvements it is necessary to operate production non-conformity analysis in-house and to introduce continuous improvements derived from these. Suppliers with their own processes must also be included in the total process chain observation and perform their contribution to the continuous improvement.

A further process to be considered is product observation after delivery and customer care. Rapid recognition of problems and a decrease of customer satisfaction must trigger immediate process improvement activities.
6. Process Audit

6.3 Evaluation Process Audit Results

6.3.1 Individual Assessment of the Questions and Process Elements

Each question is rated with regard to the particular requirements and their fulfilment for securing the process. This rating may be 0, 4, 6, 8, or 10 points with the evidence of the degree of fulfilment being the standard for the scoring: Questions with a special relation to product and process are marked with an asterisk (*) (see section 7, “Total assessment of quality capability, hurdle principle” and section 14 “Catalogue of requirements for Process Audit”).

Discrepancies from * questions will result in a down-scoring (see section 7). A good score therefore is an essential element, to fulfil the Volkswagen Group requirements of the Formel-Q Capability.

<table>
<thead>
<tr>
<th>Points</th>
<th>Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>requirements fully met</td>
</tr>
<tr>
<td>8</td>
<td>requirements mainly(^1) met; minor deviations present</td>
</tr>
<tr>
<td>6</td>
<td>requirements partially met, major deviations present</td>
</tr>
<tr>
<td>4</td>
<td>requirements unacceptably met, serious deviations present</td>
</tr>
<tr>
<td>0</td>
<td>requirements not met</td>
</tr>
</tbody>
</table>

\(^1\) With “mainly” it is meant, that more than approx. \(\frac{3}{4}\) of all requirements were effectively proven and no specific risk can be seen.

6.3.2 Overall Evaluation Process Audit

Owing to the different process steps for the respective product groups in the production element, the process steps must be summarized for the relevant product group (\(E_{PG}\)). The elements \(E_x\) and \(E_\alpha\) are independently evaluated.

It is necessary to audit individual process steps and to summarize these according to product group to ensure a correct weighting of all the elements. Different degrees of fulfilment might result for the individual product groups because of the respectively selected process steps within the production element.
6. Process Audit

The average value $E_{PG}$ for each individual product group is calculated from:

$$E_{PG} \ [\%] = \frac{E_1 + \ldots + E_n}{\text{Number of evaluated process steps}} \ [\%]$$

In this context, $E_1$ is the first and $E_n$ is the last step in the production, referring to the respective product group.

The total evaluation of the degree of fulfilment $E_P$ for the process audit of each product group is calculated as follows:

$$E_P \ [\%] = \frac{E_Z + E_{PG} + E_K}{\text{Number of evaluated elements}} \ [\%]$$

In addition to this process evaluation, the sub-elements with the system reference for the production element can also be presented separately and evaluated. These are:

EU1: Personnel / Personal Qualification
EU2: Machinery / Equipment
EU3: Transport / Parts Handling / Storage / Packaging
EU4: Failure Analysis / Corrective Measures / Continuous Improvements

A fulfilment of at least 70% is required by Volkswagen Group for EU1/EU2/EU3- (see further details in section 7 “Overall Evaluation of Q-Capability, Hurdle Principle”).

6.4 Audit Report and Self Qualification of the Supplier

The total evaluation is included in the audit report. The report should include a list of noted deviations (improvement programme) that are basis for the supplier’s corrective action including timing and responsibility.

In the case of an “A” rating, the supplier should use this Improvement Programme for further enhancement, within their own responsibility.

In the case of a “B” (“C”) rating, the completed Improvement Programme must be presented to the Volkswagen Group auditor who will accept it or demand additional improvements. After realisation of the Improvement Programme (normally within 12 weeks or the appointed time) the supplier is requested to conduct another Process Audit as per Formel-Q Capability (see section 4 “Self Assessment”).
### 6. Process Audit

#### 6.5 Execution (Flow Chart)

<table>
<thead>
<tr>
<th>Responsible</th>
<th>Support</th>
<th>Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>R: Auditor VW Group</td>
<td>S: QSK</td>
<td>I: Supplier</td>
</tr>
<tr>
<td>R: Auditor VW Group</td>
<td>S: Supplier (QS, Mgmt.)</td>
<td></td>
</tr>
<tr>
<td>R: Auditor VW Group</td>
<td>S: Supplier QS</td>
<td></td>
</tr>
<tr>
<td>R: Supplier QS</td>
<td>I: Auditor VW Group if necessary QSK</td>
<td></td>
</tr>
<tr>
<td>R: Supplier QS</td>
<td>I: Auditor VW Group if necessary QSK</td>
<td></td>
</tr>
<tr>
<td>R: Auditor VW Group</td>
<td>S: Supplier QS</td>
<td></td>
</tr>
</tbody>
</table>

#### Process Audit (VA)

- Conducting a Process Audit at a supplier, new project, new manufacturing site, not meeting the VW AG requirement A-Rating changed manufacturing processes, Q-Problems

1. **Input**
   - SL Suppliers/Self Audit Report
   - VW Group Data Storage E.P./QAD/ KVS
   - Notification

2. **Output**
   - Problem Report
   - Incident Reports
   - Audit Agenda
   - Formal Q Capability, section 5 Specifications
   - Formal Q Capability, section 6 und 11 Last IP or SL Specifications
   - Formal Q Capability, Specifications
   - Product Audit results, Problem Report
   - Improvement Programme Internal BD-Reports

- **Conducting a Process Audit**
  - Kickoff Meeting
    - If required Q/Problem review and shop floor touch at the site
  - Conducting Product Audit
    - Comment: To be done only for production of VW Group products
  - Conducting Process Audit (following the process chain)
  - Any deviations noted?
    - Yes: Immediate actions required?
      - Yes: Develop improvement programme - if required suggesting corrective actions
      - No: Define/Implement immediate actions
    - No: Realisation of immediate actions

- At supplier site
6. Process Audit

Figure 10: Process Audit
7. Overall Evaluation of the Quality Capability

Hurdle Principle

7. General

The overall evaluation for every product group is composed of:

- **Process Evaluation** with the degree of fulfilment $E_P$ for the serial production processes also considering outsourced process steps and
- **Product Audit** with displaying the fault frequencies for every fault category for series suppliers.

The total grading of the quality capability is exclusively based on Volkswagen Group’s evaluation process.

7.2 Rating Scale

The rating of an audited company is based on the following definitions:

<table>
<thead>
<tr>
<th>Rating</th>
<th>Degree of fulfilment $E_P$ [%]</th>
<th>Designation of the rating</th>
<th>Definitions / requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>$\geq 92$</td>
<td>Quality Capable</td>
<td>- Customer requirements in terms of development / series production are basically complied with; - No serious individual weak points; - Corrective action / CIP by Supplier;</td>
</tr>
<tr>
<td>B</td>
<td>$82 - 91$</td>
<td>Quality capable with conditions</td>
<td>- Deadlines for improvement programme have been set and can be implemented within an acceptable period of time; - Corrective action; - Subsequent re-audit;</td>
</tr>
<tr>
<td>C</td>
<td>$0 - 81$</td>
<td>Not quality capable</td>
<td>- No nomination - Defining immediate actions; - No new parts nomination - Realisation of the improvement programme / Investment Programme - Supplier Re-audit</td>
</tr>
</tbody>
</table>

Remark: The results are noted without a decimal. The results are rounded up or down mathematically.

The “Hurdle Principle” ($E_{ges}$) is applied for the overall evaluation of the rating according to A, B or C.

For detailed explanations see section 7.3 for downgrading criteria: Hurdle Principle.
7. Overall Evaluation of the Quality Capability
Hurdle Principle

7.3 Downgrading Criteria for the Hurdle Principle

Established failures / shortcomings in the Product Audit, Process Audit or Quality Management System Audit as well as not fulfilling the previously agreed Improvement Programme can lead to downgrading.

Within the catalogue of questions for the Volkswagen Group Process Audit (see section 14), Volkswagen has classified some questions as especially relevant for the quality capability of a manufacturing location. Those questions are defined as * questions as follows:

Asterisk Questions (* questions) are:

- B1 Supplier, purchased material: 1.1 and 1.8
- B2.1 Personnel, Qualification 2.1.3
- B2.2 Production, Machinery and Equipment: 2.2.1 and 2.2.2 and 2.2.4
- B2.3 Transport, Parts handling / Storage / Packaging: 2.3.1
- B2.4 Fault Analysis, Corrective Actions, Continuous Improvement: 2.4.5
- B3 Customer Care / Satisfaction: 3.1 / 3.6

A good rating is a mandatory condition in order to meet the requirements of Volkswagen Group for quality capability.

Questions 1.1 and 3.1 for evaluation of several production locations (e.g. outsourced process steps), always the lowest result is applied.

Reasons for downgrading from A to B, despite the degree of fulfilment $E_P \geq 92%$

- No certification of the QM system according to VDA 6.1 or - ISO/TS 16949.
- One or more evaluation elements $E_Z/E_{PG}/E_K$ were evaluated with a degree of fulfilment of less than 80%.
- At least one question in the process audit was scored with 0 points and / or the D/TLD parts verification was valued with "no".
- * Questions (see above) were scored with 4 points.
- On the product audit faults were identified as fault class B or as systematic C class faults.

Reasons for downgrading to C, despite the degree of fulfilment of $E_P \geq 82%$

- Critical quality targets of Volkswagen are not complied with.
- Target deadlines in project are not achievable or improvement / investment programme cannot be implemented before start of production (SOP). (caused by the supplier)
- During the product audit an A Class fault or a systematic Class B fault was identified.
- * Question (see above) with score 0.
- A special quality risk for the product caused by individual process steps;
- $E_Z$, an individual process step $E_1...E_n$, $E_{PG}$, $E_K$, $E_{u2}$ or $E_{u3} < 70\%$.

The auditor of the Volkswagen Group must always clearly state the reasons for the downgrading to B or C and list them in the audit report.
7. Overall Evaluation of the Quality Capability

Hurdle Principle

Reasons for subsequent downgrading to C though the degree of fulfilment $E_p \geq 82\%$

- Supplier refuses to implement an improvement programme or does not implement it after they were requested to do so.
- Self assessment $< 82\%$ or
- Not reaching an acceptable fulfilment level of the goal set by the Volkswagen Group Audit in a timely manner (A Rating)

The supplier will be informed about the downgrading by the responsible Volkswagen Group audit department in writing.

7.4 Upgrading Criteria

Upgrading through a Volkswagen Group audit can only be achieved when the supplier meets the required rating criteria, as above, at the manufacturing site.

An upgrade from C to B can only be achieved with an audit result from the Volkswagen Group with a “robust B-Rating” – which means higher than or equal to 85%.
8. Quality Verification Audit for D/TLD-Parts

8.1 General

Car manufacturers are subject to certain conditions as a result of legislation, which must be fulfilled as a minimum requirement for all series vehicles. This means that all suppliers have to maintain verification documentation, which despite the product liability (liability irrespective of responsibility), should protect the suppliers and the car manufacturer against any subsequent damage, for instance a prohibition to sell their products and penalties for non-performance (see product liability laws of the countries where the VW Group vehicles are distributed).

In order to adequately counteract the manufacturer’s liability, the Volkswagen Group has gone beyond the normal legislation, and has implemented a procedure where parts, which are important to the safety of human beings, also require special verification.

In addition to the general requirements of the quality management system, suppliers must maintain verification for individual D/TLD parts. This data must be kept for a minimum of 15 years. This also includes the following documents that are identified with “D” or “TLD”: These can include drawings, tables, production release documentation, technical delivery specifications, test specifications, sample reports, and other quality records, which can be demanded as proof and which can relieve the party of liability.

Verification documentation also includes information regarding planning type activities, the selection and qualification of personnel, suitability of test equipment, as well as process capability investigations and correspondence.

If there is a claim and/or if the Volkswagen so requests, the supplier must be in a position to prove that he has done everything in his responsibility, as the supplying company, to eliminate any faults and defects in their particular product.

Volkswagen Group’s expectation of suppliers is to apply a systematic verification process for all D/TLD parts. As proof of effective implementation of the specific requirements, the supplier is required to check at least 1x annually, its compliance to the catalogue of requirements for D/TLD parts according to section 15 and to conduct and document a self audit accordingly.

If shortcomings are identified during the audit it is expected that the supplier will implement required improvements immediately of his own accord.

The implementation of improvement measures and their effectiveness are to be verified by the supplier by conducting a new D/TLD Audit, this is within their own responsibility. Required documentation is to be kept traceable.

Results of the self audit are to be kept at least for 15 years and to be made accessible for any verification by Volkswagen group at any time. The evidence of activities by the supplier to secure and comply with quality requirements are to be guaranteed at all times.

For the verification process all defined standards according to VDA Volume1 and Volume 6 Part1, ISO/TS 16949 as well as customer specific requirements (amongst others the Formel Q Konkret) are to be considered.
8. Quality Verification Audit for D/TLD-Parts

The date of the last self audit must be documented by the supplier in the sample documentation of his products (BeOn). The self audit shall not be older than 12 months. The supplier is responsible for conducting the D/TLD Self Audit and is required to conduct such audit at least once annually. The date of the last D/TLD Self Audit must be documented on BeOn at the time of the sampling on BeOn at the latest.

Volkswagen Group reserves the rights, to verify the compliance to the requirements at the supplier, by Process Audits, Technical Reviews, D/TLD audits or other supplier visits.

Upon request the results for the D/TLD Self Audit are to be accessible to Volkswagen Group.

8.2 Audit Procedure

When auditing, the “List of requirements for Verification Audits” (D/TLD parts), (refer to section 15) must be completely checked and filled in.

8.3 Definition of Product Group / Parts Selection

(Form: Quality Audit verification for D/TLD Parts, see attachments)

The supplier must ensure, that all (D/TLD) parts and all specified characteristics which must be verified, are being taken into consideration. During the audit for each individual D/TLD characteristics, the respective products must be selected accordingly to verify the requirements during a Process and Product Audit. The selection of such reference parts will be taken from a supply list for “D/TLD Parts for Volkswagen Group” at the supplier, which must be kept up to date. The appropriate sample size for the Product Audit must be defined according to the part and the features, i.e. the products will be picked from a supply list on which all the D/TLD characteristics are listed. Additionally the supplier as the nominated specialist for the product and the manufacturing process is required to identify any relevant characteristics additional to Volkswagen Group’s specified ones, as they may be relevant for function and safety of the product.
8. Quality Verification Audit for D/TLD-Parts

8.4 Evaluation of Individual Questions/ Audit Results

Every applicable question is evaluated in terms of a consistent compliance, even when the process is secured.

<table>
<thead>
<tr>
<th>Situation</th>
<th>Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements <strong>completely</strong> fulfilled</td>
<td>yes</td>
</tr>
<tr>
<td>More than about ¾ of the specified points have been effectively proven and there is no specific risk.</td>
<td>mainly</td>
</tr>
<tr>
<td>Requirements are <strong>not</strong> or not <strong>adequately</strong> fulfilled.</td>
<td>no</td>
</tr>
</tbody>
</table>

Grading scale questions D/TLD audit

All of the applicable questions must be complied with; the supplier must resolve all of the deviations by implementing an Improvement Programme. If the supplier identifies deviations, which could directly influence the product quality (e.g. missing test device), direct containment actions must be defined by the supplier, which immediately secure the product quality.

If the supplier is still not in a position to fulfil the requirements, he must inform his contacts at the receiving factory/plant of Volkswagen Group, his contact in the Purchasing Department for Volkswagen Group and the affiliated companies immediately.

8.5 Audit Report / Improvement Programme

The report includes the following documents and verification:

- **Cover sheet** “Quality Audit, Verification for D/TLD parts”, specifies the part selection, the D/TLD characteristics, results from the Product Audit and the fulfilment of characteristics for which verification is compulsory. Defining immediate actions is required in the event that customer requirements are not complied with. The deadlines for an improvement programme that might be required are set (completion date of the entire action to be implemented).

- **Catalogue of requirements**, verification audit for D/TLD parts with evaluation.

- **An Improvement Programme** must be defined if deviations to the questions in the list of requirements (the weak points/ measures must be specified, together with the date that they will be resolved and the responsible personnel).

The identified weak points must be corrected to the agreed date.

- **Overview(s)** of the results of the Product Audit with the test results, including all D/TLD characteristics which need to be identified.

A systematic and consistent approach is applied during verification which is examined randomly and evaluated through the D/TLD self-assessment by the supplier and by Volkswagen through Process Audits.
8. Quality Verification Audit for D/TLD-Parts

8.6 Identification Codes for technical documentation

The Volkswagen Group has two identification codes that have the same degree of importance (the old “D” and the new “TLD”).

8.6.1 D Identification Code

The D identification code is used in technical documentation, such as drawings, TL-VW specifications, etc., if dimensions, textual information or section numbers are associated with legislation or internal assembly specifications. A “D” is entered in the basic text field “D identification” (drawing header, “D-Code”, or “Safety Doc” field) to identify the compulsory verification. On the applicable documents the dimensions or other D-characteristics are identified by a bar symbol (▃) above.

8.6.2 TLD-Identification Code

A D is not entered in the basic text field (drawing header) in the “Safety Doc.” Field; instead, TLD is entered. The number of the TLD sheet is then entered in the “documentation” field. This includes the features that have to be documented and information regarding any legislation. There is no bar located above the features or regulations. Only the main delivery specifications (TL) are listed in the TLD sheets. If a reference is made in this TL to another TL, compulsory verification is also applicable to this TL.

8.6.3 System of Identification at the Supplier

If the supplier utilises a different identification on his documents and records, he must present a correlation for them which presents a cross-reference for the identification requirement as described above. (e.g. a matrix with the identification symbols of each customer and the internal symbols). The matrix must be managed as a controlled document.
## 8. Quality Verification Audit for D/TLD-Parts

### 8.7 Process of Quality Verification

<table>
<thead>
<tr>
<th>R Responsible</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supplier Mgmt</td>
<td>Supplier QS/Eng.</td>
</tr>
</tbody>
</table>

**Process of D/TLD Audit**

1. **Identified discrepancies?**
   - Yes: Complete immediate actions.
   - No: Proceed to the next step.

2. **Conducting a D/TLD Self Audit**

3. **Define/Implement appropriate improvement programme**

4. **Effectiveness of the improvement programme?**
   - Yes: Information to Volkswagen Group.
   - No: Proceed to the next step.

**Input**
- Specifications/D/TLD implementation programme
- Formel Q Capability Specifications
- D/TLD Self-audit report / Improvement programme (IP) reporting D/TLD Audit Report / min. 15 years archiving
- Plan for implementation / immediate actions
- Improvement Programme / TLD Self Audit Report
- Improvement programme / Writing Information to Volkswagen

**Output**
- Supplier checks D/TLD characteristics and implements D/TLD requirements
- Do Specifications contain any D/TLD requirements?
  - No: End
  - Yes: Proceed to the next step.
8. Quality Verification Audit for D/TLD-Parts

![Flow Chart D/TLD-Audit]

Figure 11: Flow Chart D/TLD-Audit
9. Problem Analysis

9.1 General

The initiator for a Problem Analysis generally is an accumulation of customer concerns at the individual receiving Volkswagen plants.

Raising the orders for the Audit team to conduct any Problem Analysis at the manufacturing site of the supplier is initiated by the Volkswagen Group Supplier Quality dept. of the receiving plants which, are responsible for processing the concerns.

The Problem Analysis always is specific for a certain product. By specially targeted analysis and remedies of the weak points identified in the production process the failure root causes shall be eliminated.

The execution of a Problem Analysis happens, if applicable, together with experts of the QS of the receiving plant of Volkswagen Group and other affected areas of the business.

Also the Problem Analysis aids the improvement of the purchased parts quality and quality performance as well as the actual quality and/or field problems.

9.2 Execution / Process

All Processes, which could be responsible for the quality defects will be intensively analysed at the supplier location or together with the supplier, at the location of outsourced process steps of the supply chain that are within the supplier’s responsibility. During the process the failure root causes will be systematically analysed and corrective actions initiated. For the implementation of the corrective actions responsibilities and dates will be defined.

The supplier has to prove the timely and also the effective implementation of such measures. Volkswagen Group QS reserves the rights to verify the implementation.

The Problem Analysis can be communicated to the management of the affected company one day before by fax.

9.3 Escalation Principle

If there is no effective remedy of the problems guaranteed, an escalation process as described in the Formel-Q Konkret (section 4.11), will be an optional measure.
## 9. Problem Analysis

### 9.4 Conducting Problem Analysis – Flow Chart

![Flow Chart for Problem Analysis](image)

**Figure 12: Flow Chart for Problem Analysis**
10. Supplier Technical Review (TRL)

10.1 General

The Supplier Technical Review is not a replacement for Process and Product Audits, but is a further, additional quality instrument of the Volkswagen Group Quality Strategy.

With the technical review the Volkswagen Group is aiming at the following goals:

- Assuring the conformity of products and components to specified requirements.
- Verification of the serial production and all securing activities on site,
- Effectiveness check of corrective actions and verification of agreed quality management standards.

The TRL is a review to assure that parts and components comply with legal and Volkswagen requirements at all times. Additionally the quality organisation of the supplier is checked. Volkswagen can at anytime and at all suppliers conduct a review on short notice.

10.2 Reasons for conducting a TRL

The realisation of the TRL is justified if the following deviations are noted with regard to the supplier.

1. Obligation to inform VW in case a detected specification deviation (reliability/long term testing) is not done.
2. Manufacturing location change is not reported, engineering BMG / first sample approval not been granted.
3. Product characteristics during series testing are not verified sufficiently.
4. Poor quality compliance through an unstable internal / external process.
5. Unsafe process in the related sub-contractor process chain.
6. Preventive actions without direct trigger or reason.
10. Supplier Technical Review (TRL)

10.3 Evaluation TRL for Serial Production Process

The criteria for the Technical Review at the supplier are detailed in the catalogue of requirements (see section 16). The evaluation at the site is focusing on the actual supply contents for a product number or product family. The individual criteria for compliance to the requirements will be assessed and if necessary the potential and necessary measures indicated. The individual assessment is valued with “Yes” if the requirements are met, and with “No” if measures are required.

The number of individual evaluations with a “No” and their implication for the assurance of the process and product quality results, results in a total evaluation traffic light logic result.

A red traffic light requires immediate initiation of a Quality Meeting with the QS-Procurement Manager (QSK-Management) of the receiving affiliated plant of Volkswagen Group (customer plant) and the management of the supplier. With the Q-Meeting the programme for “critical serial suppliers” (PKS) can be kicked off at level 2 already. The escalation, in the last step, results in a downgrading to a “C Rating” for quality performance for the manufacturing site. All new nominations would be blocked (Business on hold) until further notice is given. The escalation principle and further explanations are explained in the Formel-Q Konkret under section 4.10 TRL/4.11 for the Programme for Critical Serial Suppliers.

10.4 Conducting a TRL

The TRL focuses on a product group and/or a part number. It will be performed by qualified associates of QS-Purchasing or Volkswagen Group Auditors.

10.4.1 Notification

The Technical Review will be notified in writing to the management of the affected supplier by Fax on the day before the audit will take place.

10.4.2 Report

After the TRL has been completed, a report will be issued at the site. To resolve the discrepancies identified, an improvement programme will be agreed with the management. Implementation dates must be reported to the responsible contacts for the TRL at Volkswagen Group in writing according to due dates.
10. Supplier Technical Review (TRL)

10.4.3 Flow Chart

Figure 13: Process Technical Revision Suppliers (TRL)
11. Sub-Supplier Management

11.1 General

The supplier is responsible for his supply chain for purchased products and outsourced processes. The supplier must ensure that all risks within his supply and process chain are clearly identified and also evaluated, and systematic measures will be implemented to reduce any risks.

For the evaluation of the supply chain, all requirements and evaluations according to Formel-Q Capability must be fulfilled. The supplier is responsible for compliance of all requirements within the supply and process chain. For the quoting process or if requested, as well as during the self audit, the supply chain must be displayed (see section 11.3). This basically includes the requirement of project specific evaluations according to ISO/TS 16949, risk analysis (critical paths similar to VDA for the maturation grade assurance) and evaluation of quality capability of the overall supply chain. Volkswagen Group reserves the right, to view such documentation and to verify the evaluation of the supplier, e.g. by mutual on-site audits of the supply chain or the outsourced process steps (see section 6 and 7). Basically the evaluations of the supply chain can be considered for the overall quality capability (see section 7).

All VW-Group suppliers are requested, as a first step, to display and to prove the complete main value adding chain (supply chain) during the quotation process. For all manufacturing steps (own contributing services / outsourced services) and product suppliers, an assessment of the quality capability is required, to identify risks within the value adding process chain and, if necessary, to be secured by appropriate corrective measures. The direct supplier (1st Tier supplier) is required to conduct such assessments of his suppliers in his responsibility. Volkswagen Group reserves the right, to verify assessments at the manufacturing sites together with the 1st Tier supplier.

Essential pre-conditions are that the direct supplier will inform his sub-suppliers along the whole supply chain of the Volkswagen Group requirements and ensures that the requirements will be known, understood, and implemented accordingly.

11.2 Defining the Structure of Sub-suppliers

Basically, the Volkswagen Group form “Sub-Supplier Structure” (see complementing documents), is to be added to the quote of the direct supplier as an attachment.

Such presentations include the following points:

1. Detailed process flow charts inclusive sub-supplier structure and all outsourced value-adding manufacturing processes / process steps.
2. Details for existing risks and the implemented measures.
3. For all sub-suppliers, the process capability evaluation, as far as possible the qualification status and the process steps outsourced by the supplier
4. The actual quality performance of the sub-suppliers.
11. Sub-Supplier Management

11.3 Changes in the Supply Chain

Changes to the supply chain or in the processes must be agreed with procurement and the affected areas of responsibility (FE, QS) and can lead to new assessment of the supplier and to new sampling of the supply content (products). Volkswagen reserves the rights to (re-)audit a modified sub-supplier structure.

See also - VW 01155 “Vehicle Bought-in Products, approval of initial deliveries and changes”.

11.4 Documentation of the Sub-Supplier Structure

The details for sub-suppliers of the direct supplier as above, must be presented on the Form “Sub-Supplier Structure” of the Volkswagen Group. The form can be found on the B2B-Platform as electronic format (supplementing document).
11. Sub-Supplier Management

11.5 Flow Chart

<table>
<thead>
<tr>
<th>Process Sub-Supplier Management</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Start</strong></td>
</tr>
<tr>
<td>Request to present the supply chain</td>
</tr>
<tr>
<td>Assessment of all sub-suppliers</td>
</tr>
<tr>
<td>Outsourced Process Steps Part of the LAPS (see note for LAPS)</td>
</tr>
<tr>
<td>Presenting the supply chain prior to &quot;B&quot; Release</td>
</tr>
</tbody>
</table>

- **Input**
  - Request for Self Audit, VW Group Form "Sub-Supplier Structure" (COB portal)
  - List of selected Process Steps (LAPS)
  - Comment LAPS during a risk assessment additional processes can be identified and defined

- **Output**
  - Presentation of the Supply Chain
  - Presentation and assessment of outsourced process steps and product suppliers on the VW Group Document Sub-Supplier Structure (COB Platform)
  - Data Base - Check with audit results Risk Assessment Sub-Supplier Structure Process - Presentation, Audit Report of Tier
  - Consideration of positive and negative lists LSA, presentation of the supply chain Risk Assessment
  - VW Group Audit Plan

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**R: Verantwortlich**
**S: Support**
**I: Information**

- **Process Sub-Supplier Management**
  - VW Group Buyer
  - Supplier Tier 1: Supplier Tier 2
  - Supplier Tier 1: Buyer VW Group
  - Supplier Tier 1: Buyer VW Group
  - Buyer VW Group: Direct Supplier Tier 1
  - QS CSC Team: Auditor VW Group
  - Direct Supplier Tier 1
11. Sub-Supplier Management

![Diagram of Sub-Supplier Management Process]

**Figure 14: Sub-Supplier Management**
12. Documents and Records of Supplier Visits

After completion of the Potential Analysis, the Process / Product Audits, the Quality Audits for D/TLD-parts, the Problem Analysis and/or a Technical Revision at suppliers, the required measures will be discussed with the supplier and dates for the Improvement Programme and its realisation defined.

The results from the Volkswagen Group assessment will be presented comprehensively in a report with details attached. Note: the forms of Volkswagen Group can be found on the B2B-Platform (www.vwgroupsupply.com) under Quality Documents online. The report must be signed by a responsible manager of the supplier and the responsible associate of the Volkswagen Group.

The information for the supplier visit, the assessment results and the reports will be communicated within Volkswagen Group and their brands.

The supplier is responsible for concretising the Improvement Programme, also to add improvement information and to submit the updates to the responsible department of Volkswagen Group within the agreed due dates. For such purposes the Improvement Programme must be updated with detailed information and with planned corrective actions, the individual realisation dates with a status as well as naming the responsible individual. Should any due dates be exceeded, it is at the discretion of the person responsible at Volkswagen Group to decide whether the situation is to be escalated (see also Formel Q Konkret section 4.11 Programme Critical Suppliers).
13. Requirements for Potential Analysis

This catalogue of requirements is the foundation for the assessment of Potential Analysis conducted by Volkswagen Group.

The Potential Analysis is divided into two sections:
1. Evaluation of the Development Process (ED)
2. Evaluation of the Manufacturing Process (EP)

13.1. Evaluation of Development Competency / Capability (ED) of a Supplier

The contents of the evaluation of development competency are not part of the Formel-Q Capability. Further explanations related to the catalogue of requirements can be found on the B2B-Plattform ([www.vwgroupsupply.com](http://www.vwgroupsupply.com)) under F+E documents and in section 3.

13.2. Evaluation of the Process (EP) for all assessed Product Groups

The following questionnaire describes the sort of questions for the Potential Analysis during an initial supplier visit by Volkswagen Group Quality Auditors.

13.2.1. Requirements for the Component / Compliance with Important Characteristics

The qualification of the supplier for specific requested product depends on whether the requirements for this product, as defined in the specifications (technical documents) can be complied with. The ability to comply with the important characteristics can be seen from special processes and quality sequences with regard to products for competitors, if necessary.

The following must, for instance be considered:

- Capability analysis ($C_{pk}$-values)
- Design and process FMEA
- Reliability values
- Required test, laboratory and measurement systems
- Required know-how
13. Requirements for Potential Analysis

13.2.2. Experience / References

The experience of the supplier with equivalent products and with the specific requirements of the automotive industry is an important indicator for the qualification of the supplier. This includes the verification of an effective QM system according to VDA 6.1 or ISO/TS 16949. The qualification of the staff and their responsibility in the development and manufacturing processes are of particular importance.

Questions / Subjects:

- Experience with equivalent parts
- Main percentage of the added value and influence on important characteristics through the supplier’s manufacturing process
- Realisation of just-in-time concepts (internally / externally)
  - Internally: integrated order control, JIT
  - Externally: JIT, warehouse, direct delivery
- Effective and evaluated QM System
- VDA 6.1/ ISO/TS 16949 Certificate
- Audits by 3rd party (3rd party audits by accredited certifiers acc. to IATF rules)
- Self Audits, evaluation of process quality / capability
- VDA 6.3 Self and third party audits
- Other process and product audits

13.2.3. Process Development Options / Project Planning

The experience of the supplier with regard to the management of projects is significant for successful project handling. The evaluation can be carried out, based on past projects that have already been completed, the standard process plans for the project management of the supplier and the activities that have been executed within the framework of the quotation for Volkswagen, such as, for instance feasibility studies.

Questions / subjects:

- Nomination of project supervisors and regulation of the interfaces
- Project stages with specified targets
  - Time schedules determined
- Capacities available
  - Qualification of personnel
  - Pre-material
  - Buildings
  - Facilities, tools, test instruments
  - Containers
  - CAM
  - CAQ
13. Requirements for Potential Analysis

- Compliance with the product specific requirements
  - Customer requirements / legal requirements
  - Handling
  - Packaging
  - Design of workplace / test site
  - Process FMEA
  - Capability proofs for systems
  - Tools
  - Test instruments

- Communication facilities
  - Translation of documents
  - Data Transfer
  - Data processing interfaces

- Securing of the above-mentioned points at sub-contractors
  - Project stages
  - Approval procedure
  - Targets
  - Capacities
  - Product requirements – purchased parts
  - Communication
13. Requirements for Potential Analysis

13.2.4. Q-Methods / Q-Techniques

Constant improvement of product quality according to the expectations of the customer is necessary to ensure competitiveness. Volkswagen suppliers are significantly involved in this continuous improvement process. The suitability to being a Volkswagen supplier depends on the supplier’s innovative capacity and his ability regarding systematic improvement. The application of quality methods and techniques is an important requirement in this regard. The technical conditions for component and damage analysis must also be available.

13.2.5 Pre-Material / Purchased Parts

To assure customer satisfaction, it is essential, not only to manage the in-house production, but also processes for the product at sub-suppliers must be evaluated and qualified according to their amount of responsibility by the direct supplier. Supply security for the customer and the certainty of traceability on products is to be guaranteed only if the processes at the sub-suppliers are considered.

Questions / Subjects:

- Storage
  - Integrated storage system
  - Storage conditions that prevent any damage
  - First-In, First-Out
  - Storage periods
  - Order, Cleanliness
  - Identification

- Capability proofs / process optimisation
  - Cmk, Cpk
  - Continuous improvement

- Supplier evaluation
  - Quality capability (with escalation procedure for critical suppliers)
  - Quality performance
  - Logistical performance

- Supplier qualification
  - Quality management agreements
  - Supplier Audits

- Improvement Programme (with follow up)
13. Requirements for Potential Analysis

13.2.6. Customer Care / Customer Satisfaction (Service)

Suitable processes must be used to secure the 'as delivered' quality. These processes include for instance, monitoring of problem resolution and initiating corrective actions, securing customer supply through defined emergency and failure strategies, monitoring of the delivery quality and logistical requirements through product inspection and shipping (dock) audits.

Questions / Subjects:

- Continuous contacts with customers
  - Development coordination at the customer
  - Communication facilities
  - Command of foreign languages
  - Knowledge regarding the use of the product

- Emergency and failure strategy
  - Interruptions in the manufacture and during transport
  - Shipping problems
  - PPS failures
  - Failure in the data transfer

- Execution of product audits, are there in-house test facilities at the supplier
  - For purchased parts
  - Sub-Groups
  - Installation tests
  - Re-qualification tests
  - Packaging
  - Identification

- Execution of reliability tests

- Problem resolution
  - Failure analysis
  - Determination of causes
  - Improvement programmes
  - Competent contact persons for problems that occur (preferably German speaking)

- Shipping Logistics
  - Container control and maintenance
  - Shipping documents
  - Label on parts / containers
13. Requirements for Potential Analysis

13.2.7. Production

The ratings with regard to the individual questions of the element “7. Production”, represent a summary of all the process stages that are to be considered. One single weak point in one single process stage that has a significant influence on the entire product will result in a negative evaluation of the respective question / subject field.

13.2.7.1 Process Stages (applied process stages)

The process stages that are relevant to the potential product are evaluated, and if required also the proof and the measures for securing external process stages and actions will be considered.

If it is intended to run the manufacturing process of the VW products enquiry on existing equipment, such equipment must be included for the evaluation.

Comparable processes, where available should be evaluated if the supplier plans to purchase new systems. The auditor will additionally inspect the documents, such as timing plans or specifications, additional investments or the overall product programme for the planned operating resources, where necessary.

Questions/Subjects:

- Suitable machines / equipment
  - Capability studies
  - Automatic controls
  - Controlling systems
  - Securing of parameters
  - Maintenance conditions
  - Capacity

- Flexibility of the manufacturing / test equipment

- Defective units / corrections

- Ergonomic design of the workplace

- Staff qualification / supplier’s responsibility / allocation of tasks
13. Requirements for Potential Analysis

13.2.7.2 Process Specifications / -Quality

Defined process control is a pre-condition to ensure a constantly high quality of the product. The determination and the compliance for the parameters, the methods, the monitoring and the control of the product characteristics in the processes are considered for the evaluation.

Questions / Subjects:

- Manufacturing and test specifications, reference parts
- Manufacturing release
- SPC / Fault summary cards / Raw data chart with trend tendency recognition
- Logbook

13.2.7.3 Material Flow

Possible quality losses of parts caused by internal transport are evaluated. In this regard, parts control to prevent incorrect assembly or the use of “not OK parts” as well as the deterioration in quality caused by parts handling or unsuitable means of transport are of particular importance.

Question / Subject:

- Identification / transfer of OK parts
- Supply of components
  - Just in Time
  - Kanban
  - Short distances travelled, transport flow
- Quarantine parts store
- Parts handling
- Suitable transport facilities / containers
- Packaging
- Overfilling
14. List of Requirements for the Process Audit

Series Production

The pre-requisite of series production with satisfactory process capabilities is the strict implementation of all required actions resulting from the product development process. Considering the customer requirements, the process at the subcontractors product delivery and utilisation must be evaluated and improved on a continuous basis.

Customer orientated actions in all processes is the pre-requisite for customer satisfaction regarding quality, price, service and innovation. It is the responsibility of the management to provide for the necessary pre-conditions in all processes.

The quality performance is determined by man, machine, material, method and environment, and by lean production processes, low stock levels and highly qualified employees. The responsibility of employees must be characterised by independent recognition of product and process non-conformities. Improvement actions must be initiated and implemented by their own initiative.

The processes and process steps must be continually evaluated using suitable methods. Non-conformities must be analysed and appropriate corrective actions carried out to maintain and improve the process capability and to meet all requirements relating to the Zero-Defect demands of the customer.

The supplier is required to monitor his products after production in order to maintain and to improve customer satisfaction. Active co-operation with the customer and early recognition of concerns and non-conformities are the basis for a long-term trusting relationship.

Based on the experiences from the past, Volkswagen Group have identified the following questions, which are marked with (*), as especially significant questions for the evaluation of the process capability. A good score for the “* - questions” is a mandatory pre-condition to fulfil the requirements for quality capability of Volkswagen Group. Further details can be found in section 7, “Overall Evaluation of Quality Capability, Hurdle Principle”.
14. List of Requirements for the Process Audit

14.1 Sub-Contractors / Purchased Material

Reduced supply times to the customer (e.g. just in time) and reducing the throughput times influence the procurement time and require special activities in the individual process steps. A trouble free system that is free of defects is required in this regard as it is usually not possible to compensate for failures or delivered defects by using alternative parts or materials. If only a small or no temporary stock volume is available, quantitative or logistical interruptions cause direct production interruptions.

The supplier and his sub-contractors have the responsibility and the duty to secure the processes and the process sequences, and to ensure the process capability with regard to all the customer relevant and important characteristics for the relevant products / materials. Supplier’s Process and Product Audits after the risk analysis are required. The quality capability of sub-contractors can also be proven by a first or third party audit.

The effectiveness of corrective actions and continuous improvement must be proven. **If modules are delivered, the supplier is fully responsible for the quality of all the individual components (this includes VW assigned suppliers).**

1.1 * Are only approved and qualified sub-contractors used?
1.2 Is the quality of purchased parts assured?
1.3 Is the quality performance evaluated and are the improvement actions initiated in case of non-conformities?
1.4 Are continuous improvement activities and objectives for the products and processes agreed with the sub-contractors and implemented?
1.5 Are the necessary releases available for all supplied series products and are the required improvement actions implemented?
1.6 Are the agreements relating to products supplied by the customer adhered to?
1.7 Are the stock levels of purchased material in line with the production requirements?
1.8* Are purchased materials and internal surpluses delivered and stored appropriately?
1.9 Are the staff qualified for their tasks?
14. List of Requirements for the Process Audit

1.1* Are only Approved and Qualified Sub-Contractors used? (*-question)

Requirements / Explanations

Prior to the acceptance of sub-contractors, an assessment of their quality management system (certification, auditing) must be available. Before the start of series production, it must be ensured that only qualified subcontractors are used. Experience from analysing the quality performance of the sub-contractors must be considered.

For example, the following must be considered:

- Discussions with the sub-contractors, regular sub-contractor follow up.
- Assessment of the quality capability, e.g. audit results, process / product audits, QM-System Certificates
- Selection according to ranking of the quality performance (Quality / Cost / Service)
- Special release for D /TLD-suppliers

With the evaluation at several production sites, e.g. for outsourced process steps or within the supply-chain, the listed requirements must be considered on the evaluation (see section 7.3 - downgrading criteria with hurdle principle).

1.2 Is the Quality of the Purchased Parts assured?

Requirements / Explanations

Significant inspection capabilities (Laboratory and Measuring equipment), in-house (internal Know-how, short reaction time for problem analysis). Supplier owned laboratories according to ISO/IEC 17025. External laboratory according to ISO/IEC 17025 (or nationally comparable) accredited.

For example, the following must be considered:

- Sufficient inspection equipment (laboratory and measurement equipment)
- Internal / external inspection
- Gauges and fixtures supplied to the sub-contractors
- Drawings, order details, specifications
- Quality assurance agreements
- Agreements on inspection and test methods, inspection and test sequence, inspection and test frequencies
- Analysis of key nonconformities
- Acceptable capability documentation (in particular for critical characteristics of products and processes)
14. List of Requirements for the Process Audit

1.3 Is the Quality Performance evaluated and are Improvement Actions initiated in case of non-conformities to the requirements?

Requirements / Explanations

The capabilities and performance of sub-contractors should be checked at defined time intervals. The results must be analysed and recorded by part number in a list (sub-contractor list). In the case of negative results, qualification programmes must be defined and their implementation must be verified. If modules are delivered, the supplier is fully responsible for the quality supervision regarding all the individual components.

For example, the following must be considered:

- Reports of quality meetings
- Agreement and follow-up of improvement programmes
- Inspection, test, and measurement records of improved parts
- Analysis of key non-conformities and problem sub-contractors
- Evaluation of the quality performance (quality / costs / service)

1.4 Are Continuous Improvement activities and objectives for Product and Processes agreed with the Sub-Contractors and implemented?

Requirements / Explanations

The task is of particular significance to the delivery of modules. The supplier is fully responsible for a continuous improvement of the sub-contractor.

For example, the following must be considered:

- Workshops (interdisciplinary work groups)
- Definition of measurable indicators for quality, cost optimisation and service, e. g.:
  - Reduction of inspection time with simultaneous increase in process capability
  - Reduction of rejects (internal / external)
  - Reduction of excess WIP, stock, etc.
  - Increase in customer satisfaction
14. **List of Requirements for the Process Audit**

1.5 **Are the necessary releases available for all supplied Series Products and are the required improvement actions implemented?**

**Requirements / Explanations**

Prior to the series production of new or changed products and processes a release must be approved for all products from sub-contractors. If modules are delivered, the supplier is fully responsible for the quality supervision of all the individual components.

For example, the following must be considered:

- Customer information (specifications / standards / test specifications /, etc.)
- BMG releases and test releases
- Initial Sample Reports according to VDA
- Capability records for important characteristics
- Observation of EU safety data sheets and “List for declarable substances in the automotive industry – substances in components and materials” (see IMDS)
- Analysis of reliability
- Re-qualification test reports
- Documents for materials and weights

1.6 **Are the agreements relating to products supplied by the customer adhered to?**

**Requirements / Explanations**

The requirements for customer supplied products must be taken from the quality agreements and must be strictly implemented.

Customer-supplied products can be:

- Services
- Tools, test and inspection equipment
- Packaging
- Products

The following must, for example, be considered:

- Control, verification, storage, transportation, maintenance of quality and part characteristics (expiration dates)
- Information flow for deficiencies or losses
- Q-Documentation (Q-level, Q-History)
14. List of Requirements for the Process Audit

1.7 Are the Stock Levels of Purchased Material in line with the Production requirements?

Requirements / Explanations

The necessary stock levels must already be determined and considered in the process planning phase. If requirements change the analysis of the necessary stock levels must be updated if necessary.

For example, the following must be considered:

- Customer requirements
- KANBAN/Just-in-time
- Storage costs
- Contingency strategy for purchased material bottlenecks
- FIFO (First in - First out)

1.8* Are Purchased Materials and Internal Surpluses delivered and stored appropriately? (*=Question)

Requirements / Explanations

Delivered pre-materials and returned residual quantities from the production must be stored according to the release status and in a manner to prevent any damage or mix-up. Suspect / defective products must be transferred to a quarantine storage area.

For example, the following must be considered:

- Packaging
- Storage administration system
- FIFO (First in - First out) / batch-related use
- Order and cleanliness
- Climatic conditions
- Protection from damage, dirt and corrosion
- Identification (traceability, inspection status, job sequence, use status)
- Prevention of mix ups
- Quarantine storage, (arranged and used)
14. List of Requirements for the Process Audit

1.9 Are the staff qualified for their individual tasks?

Requirements / Explanations

For the staff that are responsible for activities, the following must for example be considered:

- Selection, assessment and qualification of sub-contractors
- Product inspection
- Storage / Transport
- Logistics

Knowledge must be available of e.g.: 

- Product, specifications, special customer requirements
- Special knowledge with regard to the product characteristics and the manufacturing sequences of the individual parts or modules
- Standards, laws
- Packaging
- Processing
- Assessment methods (e.g. audits, statistics)
- Quality techniques (e.g. 8-D-methods, root cause and effect diagram)
- Foreign languages
14. List of Requirements for the Process Audit

14.2. Production (each process stage)

In the individual process stages for the manufacture of a product, the planned and implemented technical and personnel procedures and process sequences must be maintained, monitored and continually improved with consideration of economic aspects. Key focus areas of this element are, employee qualification, process capabilities, inspection, test and measuring equipment and their improvement, as well as specific transportation and storage conditions for the product.

The basis for all the activities are the customer requirements for each product and the related processes. All the changes that are implemented until the production of the product ceases must be integrated. All changes must be recognised early and be incorporated in the individual processes.

The customer requirement for zero defects must be present in all process steps and the management of the company must provide the necessary conditions.

Process orientated acting on internal manufacturing processes is of particular importance. For this, it is crucial, that internal customer supplier processes need to be identified and monitored (measuring the internal customer satisfaction grade). Suitable monitoring must be conducted. Internal customer supplier relationships must be continuously improved. Suitable methods for this could be, to conduct quality workshops, the introduction and implementation of teamwork and giving personal responsibility to individuals during individual process stages.

All changes in the manufacture of a product must be relayed to the customer who decides to what extent additional qualification actions or new releases are necessary (see also VDA-booklet volume 2).
14. List of Requirements for the Process Audit

14.2.1 Personnel / Qualification

It is the responsibility of management to select employees according to the qualification requirements of their job, to maintain their qualification, and to develop them for further jobs with additional requirements. The qualification of the employees for their relevant tasks in product and process must be traceable.

The employees must know the customer requirements and quality objectives. The tasks assigned to them must visibly demonstrate individual responsibility for quality.

Based on a capacity analysis, sufficient qualified personnel must be selected and used for all processes. Necessary replacement personnel must be determined for the individual processes. Here too, qualified personnel must be available.

2.1.1 Are responsibilities and authority assigned to the personnel who control the product and process quality?

2.1.2 Are responsibilities and authorities assigned to personnel with regard to the production equipment and the production environment?

2.1.3* Are the employees qualified to complete the defined tasks and is their qualification maintained?

2.1.4 Does a personnel plan exist, which includes replacement guidelines?

2.1.5 Is there a system for employee motivation and is it used effectively?
14. **List of Requirements for the Process Audit**

2.1.1 **Are responsibilities and authorities assigned to the Personnel who control the Product and Process Quality?**

Requirements / Explanations

For example, the following must be considered:

- Initiation of improvement programmes
- Worker self-inspection
- Process release (equipment release, initial unit inspection / final unit inspection)
- Process control (interpretation of control charts)
- Quarantine authority

2.1.2 **Are responsibilities and authority assigned to Personnel with regard to the Production Equipment and the Production Environment?**

Requirements / Explanations

For example, the following must be considered:

- Order and cleanliness (housekeeping)
- Performance or initiation of repairs and maintenance, total productive maintenance (predictive / preventive)
- Availability of parts, storage
- Setting up and calibration of inspection, test and measurement equipment

2.1.3* **Are the employees qualified to complete the defined tasks and is their qualification maintained?** (*Question)

Requirements / Explanations

For example, the following must be considered:

- Records of induction training, training and qualification regarding the process
- Knowledge of the product and possible / occurred product non-conformance
- Instruction in occupational health and safety regulations, and environmental subjects
- Instruction in handling components requiring documentation (D/TLD)
- Qualification records (e.g. welding certificate, eye test, and driver licence for factory vehicles)
14. List of Requirements for the Process Audit

2.1.4 Does a Personnel Plan exist, which includes replacement guidelines?

Requirements / Explanations

Personnel planning must consider absences (sick leave, holiday, vacation, and training). It must be ensured that the replacement personnel have the necessary qualifications.

For example, the following must be considered:

- Shift plan (contract related)
- Qualification record (Qualification matrix)
- Work analysis, time studies (e.g. MTM, REFA)

2.1.5 Is there a system for Employee Motivation and is it used effectively?

Requirements / Explanations

The willingness to improve performance and quality awareness must be promoted through targeted information.

For example, the following must be considered:

- Quality information (target to actual values)
- Improvement suggestions
- Special voluntary activities (additional training, quality circles)
- Low absenteeism
- Contribution to quality improvement
- Self assessment

Note: This question relates also to question 2.4.6
14. List of Requirements for the Process Audit

14.2.2 Machinery / Equipment

The production equipment must be capable of fulfilling the quality requirements for the product. The required process capability must be achieved and maintained. Inspection, test and measuring equipment must equally meet these requirements.

When restarting production, special requirements must be adhered to. Appropriate work and inspection stations must be established. Both product and process must obtain release before start of production. Quality and process data from the previous production run must be known. All defined improvement actions must be implemented.

2.2.1* Does the available production equipment and tooling ensure that the quality requirements for the product are met?

2.2.2* Can the quality requirements be effectively monitored with the measurement and inspection equipment used?

2.2.3 Are the work and test stations laid out according to the process requirements?

2.2.4* Are the relevant details fully completed and adhered to in the production and inspection documents?

2.2.5 Is the appropriate equipment and tooling available to support product changeover?

2.2.6 Is a release provided for the start of series production and are set up data and deviations recorded?
14. List of Requirements for the Process Audit

2.2.1* Does the available Production Equipment and Tooling ensure that the quality requirements for the product are met? (*-Question)

Requirements / Explanations

The process capability of selected important product / process characteristics must be determined and continuously be improved. Cmk / Ppk values of greater than or equal to 1.67 must be reached for the short-term process capability (MCS) and the Provisional Process Capability (PCS). The minimum requirement for the long-term process capability Cpk is greater than or equal to 1.33 with continuous improvement.

For example, the following must be considered:

- Machine / process capability verification for important characteristics and process parameters
- Forced control, control of important parameters
- Warning mechanism to detect deviations from specifications limits (e.g. warning lights, alarm sounds, process shut downs)
- Loading and unloading fixtures
- Service and maintenance status of tools, equipment and machinery (including planned maintenance)

2.2.2* Can the quality requirements be effectively monitored with the Measurement and Inspection Equipment used? (*-Question)

Requirements / Explanations

For example, the following must be considered:

- Reliability, functional, and corrosion resistant tests
- Measuring accuracy, measurement system capability
- Data acquisition and potential for data evaluation
- Calibration records for inspection, test and measurement equipment

Supporting documents:

- Inspection Process Capability Studies – consideration of measurement in-accuracy on inspection processes (VW10119)
- VDA volume 5
14. List of Requirements for the Process Audit

2.2.3 Are the Work and Test Stations laid out according to the Process requirements?

Requirements / Explanations

The working environment (also for rework) must be coordinated with the work content and the products in order to prevent soiling, damage, and mix up and misinterpretation.

For example, the following must be considered:
- Ergonomics
- Lighting
- Order and cleanliness
- Environmental protection
- Working environment, handling of parts and components
- Occupational health and safety regulations

2.2.4* Are the relevant details fully completed and adhered to in the Production and Inspection documents? (*-Question)

Requirements / Explanations

Process parameters and inspection, test and measuring characteristics must always be specified with tolerances. The production and inspection documents must always be available at both the work place and inspection station. Non-conformities and corrective actions must be documented.

For example, the following must be considered:
- Process parameters (e.g. pressure, temperature, time, speed)
- Data regarding machines / tools / auxiliary equipment
- Inspection and test specifications (important characteristics, test and inspection equipment, methods, and frequencies)
- Control limits of control charts
- Machine and Process Capability verification
- Operating instructions
- Work instructions
- Inspection and test instructions
- Information regarding the latest failure analysis
- Controls for process influencing parameters should be protected from unauthorised adjustment.
14. List of Requirements for the Process Audit

2.2.5 Is the appropriate Equipment and Tooling available to support product changeover?

Requirements / Explanations

For example, the following must be considered:

- Set-up plans
- Set-up aids, reference aids
- Flexible tool change equipment
- Boundary / reference samples

2.2.6 Is a release provided for start of Series Production and are set up data and deviations recorded?

Requirements / Explanations

"Release for series production" is the order related release for the initial start of production as well as for a production restart after interruption. The release is necessary for product and process and must be provided by authorized personnel in writing on the basis of defined acceptance criteria. All known problems from the product and process planning phase, and from previous series production must be eliminated.

The release inspection must be performed according to clear inspection instructions in order to ensure reproducibility. A check list is useful for this purpose.

If production is continued without the required inspection, the products must remain quarantined until the required inspection has been conducted and the products are found to be acceptable. A release is also required for products that have been reworked.

For example, the following must be considered:

- New or changed product
- Stoppage of equipment, process interruption
- Repair, tooling change
- Material change (e.g. batch change)
- Changed production parameters
- First off inspection with documentation
- Parameters up to date
- Order and cleanliness at the work site
- Packaging
- Release and change status of tooling, and inspection-, test and measuring equipment
14. List of Requirements for the Process Audit

14.2.3 Transportation / Parts Handling / Storage / Packaging

Production steps must continually be co-ordinated with each other, with only the customer’s required amount being produced. Intermediate storage of products should be avoided. The production and inspection status of parts must be recognisable by appropriate identification. Assembly parts, rejects and rework parts require special supervision and identification.

Storage and transportation equipment must be co-ordinated for the entire process chain with the specific product manufactured for the customer, and must not have a damaging effect on the product.

With longer production stoppages, tools, production equipment, and inspection, test and measuring equipment must be suitably preserved and stored in order to prevent damage. Immediate use without lengthy preparation must be ensured.

2.3.1 Are the production volumes planned in accordance with the customer demand and conveyed as planned to the next production step? Are there any additional risks for the products in the transport (logistic links) of outsourced process steps?

2.3.2 Are products and components appropriately stored and are the transportation means and packaging equipment co-ordinated with the specific characteristics of the products/components?

2.3.3 Are reject, rework, set-up parts and excess material conscientiously separated and identified?

2.3.4 Is the material and parts flow secured against mixing / confusion and is traceability ensured?

2.3.5 Are tools, facilities, and inspection, test and measuring equipment stored appropriately?
14. List of Requirements for the Process Audit

2.3.1* Are the Production Volumes planned in accordance with customer demand and conveyed as planned to the next production step? Are there additional product risks resulting from the outsourcing of process steps within the transport chain? (*-Question)

Requirements / Explanations

For example, the following must be considered:

- Outsourced process steps (additional risks for the product within the transport chain e.g. by parts handling, transport ways, etc.)
- Appropriate / sufficient transport means
- Defined storage locations
- Minimal or no intermediate storage
- KANBAN
- Just-in-time
- First in - first out
- Storage management
- Change status
- Only conveyance of conforming parts
- Recording and analysis of the number of units
- Information flow

Note: If material or parts are directly supplied to production stations, the requirements of question 1.7 are also to be considered.

2.3.2 Are Products and Components appropriately stored and are the Transportation means and Packaging Equipment coordinated with the specific characteristics of the Products and Components?

Requirements / Explanations

For example, the following must be considered:

- Inventory / stored quantities
- Protection from damage
- Parts positioning
- Order, cleanliness, overfilling/overstocking (storage areas, container)
- Control of storage time
- Environmental influences, air conditioning

Note: If material or parts are directly supplied to the respective production stations, the requirements of questions 1.7 and 1.8 are also to be considered.
14. List of Requirements for the Process Audit

2.3.3 Are rejects, rework, set-up parts and excess material conscientiously separated and identified?

Requirements / Explanations

For example, the following must be considered:

- Quarantine areas, quarantine storage
- Labelled containers for scrap, rework and set-up parts
- Non-conforming products and non-conforming characteristics
- Release status
- Defined reject and rework stations in production

2.3.4 Is the Material and Parts flow secured against mixing / confusion and is traceability ensured?

Requirements / Explanations

Considering the product risks, traceability must be ensured over the entire process chain from the supplier to the customer.

For example, the following must be considered:

- Parts identification
- Identification of production, inspection and use status
- Batch identification
- Expiry dates
- Removal of invalid identification
- Work documents with parts and production data

2.3.5 Are tools, facilities, and inspection, test and measuring equipment stored appropriately?

Requirements / Explanations

Also tools, facilities, and inspection, test and measuring equipment, which are not in use and not released must be stored and administered appropriately.

For example, the following must be considered:

- Damage proof storage
- Order and cleanliness
- Defined storage areas
- Issue administration
- Environmental influences
- Identification
- Defined release and change status
14. List of Requirements for the Process Audit

14.2.4 Failure Analysis, Corrective Actions, Continuous Improvement (CIP)

The supplier has the duty to recognise deviations from the customer requirements using ongoing product and process observations and to eliminate these by using suitable actions. Progress towards the zero defect demand of the customer must be made by continuous improvement using preventive methods in all processes, assisted by statistical techniques.

The pre-requisite for any improvement is a detailed failure analysis in order to be able to identify the true root causes and to initiate appropriate corrective actions. The effectiveness of corrective actions performed must be proven in each case.

In the comprehensive fault correction process and for continuous improvements, employees responsible for specific processes must be involved and actively integrated. Customer orientation is a vital foundation for this.

2.4.1 Are quality and process data completely recorded and in such manner that they can be analysed?

2.4.2 Are quality and process data statistically analysed and are improvement programmes introduced from the analysis?

2.4.3 Are the causes analysed and is corrective action initiated in the event of any deviations from the product and process requirements?

2.4.4 Is the required corrective action implemented according to the deadlines and is effectiveness verified?

2.4.5* Are processes and products regularly audited?

2.4.6 Are products and processes continually improved?

2.4.7 Are targets set for the product and process and is their achievement followed up?
14. List of Requirements for the Process Audit

2.4.1 Are Quality and Process data completely recorded and in such a manner that they can be analysed?

Requirements / Explanations

Quality and process data must be completely available for the verification of adherence to requirements. Their potential for analysis must be ensured. Special events must be documented (log book).

For example, the following must be considered:

- Raw data charts
- Fault analysis charts
- Control charts
- Data acquisition
- Recording equipment for process parameters (e.g. temperature, time, pressure)
- Equipment down times
- Parameter changes
- Power failure

2.4.2 Are Quality and Process data statistically analysed and are Improvement Programmes introduced from the analysis?

Requirements / Explanations

Findings and problems must be allocated to the process owner. It is the responsibility of the process owner to define the improvement programme and to implement the improvements.

For example, the following must be considered:

- Process capabilities
- Defect types / defect frequencies
- Defect costs (costs of nonconformities)
- Process parameters
- Scrap/rework
- Hold notes / notes of sorting actions
- Cycle time, process times
- Reliability, failure mode behaviour
- Function

For example, the following can be used:

- SPC
- Pareto-Analysis
- Cause and effect diagrams
14. List of Requirements for the Process Audit

2.4.3 Are the causes analysed and is Corrective Action initiated in the event of any deviations from Product and Process requirements?

Requirements / Explanations

When process or product non-conformities occur, appropriate action must be taken immediately (e.g. quarantining, sorting, informing) until the effectiveness of performed corrections are verified. This procedure is necessary in order to meet the **zero defect** requirements.

For example, the following must be considered:

- Deviations to dimensions, material, functional, and endurance tests
- Cause and Effect diagrams
- Taguchi, Shanin
- FMEA / Failure analysis
- Process capability analysis
- Quality circles
- 8D-method

2.4.4 Is the required Corrective Action implemented according to the deadlines and is its effectiveness verified?

Requirements / Explanations

Corrective actions refer to the entire process chain from the pre-material to the utilisation at the customer. Once corrective actions have been executed, their effectiveness must be verified and must be proven.

For example, the following must be considered:

- Risk analysis (Process FMEA) / fault analysis
- Improvement programme from audits
- Findings / action from maintenance / service
- Information back to person that caused the problem
- Interfacing discussions internal / external
- Internal complaints
- Customer complaints
- Customer surveys
14. List of Requirements for the Process Audit

2.4.5* Are Processes and Products regularly audited? (*-Question)

Requirements / Explanations

Audit plans must be available for the product and its manufacturing process.

For example, situations requiring an audit are:

- New projects / Processes / Products
- Non-compliance with quality requirements (internal, external)
- Verification of adherence to quality requirements
- Identification of improvement potential

Non-conformity reports must be passed to the persons responsible and the improvement actions followed up.

For example, the following must be considered:

- Customer requirements
- Important characteristics
- Function
- Packaging
- Process capability

2.4.6 Are Products and Processes continually improved?

Requirements / Explanations

The improvement potential must be developed from the present knowledge about quality, cost and service

For example, the following must be considered:

- Cost optimisation
- Reduction of waste (e.g. scrap and rework)
- Improvement of process stability (e.g. analysis of process chain)
- Optimisation of set-up times, increase in system availability
- Reduction of processing times
- Reduction of stock levels
2.4.7 Are targets set for the Product and Process and is their achievement followed up?

Requirements / Explanations

Target values must be established, they must be achievable, and it must be ensured that these target values are up to date. Special measures required must be defined and converted if necessary.

For example, the following must be considered:

- Presence and absence of personnel
- Production quantities
- Quality key performance indicators (e.g. error rates, audit results)
- Processing times
- Non-conformity (non-conformity costs)
- Process key performance indicators (e.g. Process capability)
14. List of Requirements for the Process Audit

14.3. Customer Care / Customer Satisfaction (service)

The customer demands goods free of non-conformities and satisfaction for all the requirements for any further processing and use of the product. Included is care (service) after delivery of the product by the supplier in order to recognise deviations from the customer requirements and expectations and to maintain or achieve customer satisfaction through suitable corrective actions. The function of customer care therefore has a key role in the measurement of the customer satisfaction. It must be staffed by quality personnel and have the potential to bring improvement to all levels and areas of the supplier.

The supplier must ensure quick reactions to quality problems and that parts supply is ensured according to the quality requirements.

The compliance with the logistical requirements of the customer also contributes to maintaining customer satisfaction. The entire packaging and delivery process (to the customer) must be considered for this purpose. The type and scope of the packaging as well as the transmission of the logistical data must be defined in specifications between the responsible logistics departments (supplier / customer).

3.1* Are the customer requirements regarding the QM system, product and process complied with?

3.2 Is the customer service guaranteed and are complaints recorded and evaluated?

3.3 Are there contingency plans for ongoing supply of parts and immediate actions taken for problems?

3.4 Are all non-conformities analysed and improvement actions implemented?

3.5 Are the personnel qualified for their individual tasks?

3.6* Is the verification for D/TLD-parts and additional legal requirements evaluated by regular internal audits?

3.7 Does the packaging and the identification of the containers as well as the data exchange (B2B-platform) comply with the customer requirements?
14. **List of Requirements for the Process Audit**

3.1* Are the Customer requirements regarding the QM system, Product and Process complied with? (*-Question)

**Requirements / Explanations**

All requirements especially those that are entered in the supplier evaluation (e.g. delivery, processing and functional quality) of the customer must be considered.

For example, the following must be considered:

- QM-system-certification according to VDA 6.1 and/or ISO/TS 16949
- Quality agreements
- Target agreements on zero defect demand
- Dock audits
- Functional tests / inspections
- Endurance tests (determination of failure modes)
- Storage / processing / parts availability / distribution
- Suitability of inspection and test and measuring equipment
- Synchronised inspection procedures
- Up-to-date specifications
- Implementation of the requirement Formel-Q New parts Integral (QPN) (including acceptance of the 2 Day Production Run)

When the evaluation has to take place at several manufacturing sites, e.g. if process stages are outsourced or are part of the supply chain, the defined requirements must be considered accordingly (see section 7.3 downgrading criteria with hurdle principle).

3.2 Is the Customer Service guaranteed and are complaints recorded and evaluated?

**Requirements / Explanations**

Competent personnel must be available within the various organisational areas of responsibility as contacts for the customer.
Customer care is also a measure of active product design and development. The supplier has a duty to observe and if necessary improve products in all stages of product development and usage steps.

For example, the following must be considered:

- Records of customer visits, if necessary actions initiated from visits
- Knowledge about product use
- Knowledge about product problems, transportation complaints
- Implementation of new requirements
- Communication improvement actions
- Notification of product and process changes / location changes, also sub-contractor changes
- Initial / repeated sampling (test, during serial production)
- Re-qualification tests
- Information for deviation from requirements (also packaging and transport)
- Quality of the logistical data (e.g. statement regarding container stocks) at the supplier.
14. List of Requirements for the Process Audit

3.3 Are there contingency plans for ongoing supply of parts and immediate actions taken for problems?

Requirements / Explanations

Concepts for the assurance of parts supply must already be prepared during process planning, also in the case of unplanned problems. During serial production such concepts shall be kept up to date.

For example, the following must be considered:
- Emergency plans (e.g. for alternative productions, sub-contractors, packaging, transportation)
- Capacities and reaction times for initiating sorting actions
- Flexibility for modifications on facilities, special equipment and tools
- Usage of external capacities

3.4 Are all Non-conformities analysed and Improvement Actions implemented?

Requirements / Explanations

For example, the following must be considered:
- Facilities for fault analysis (laboratory, inspection / test facilities, personnel)
- Essential in-house analysis / testing facilities availability (laboratory, inspection-/test equipment, personnel)
- Laboratory according to ISO/IEC 17025 requirements
- PARETO analysis regarding fault characteristics (internal / external)
- Involvement of all the relevant departments (internal / external)
- Applying systematic problem elimination methods (e.g. 8-D-report)
- Processing of sampling deviations
- Revision of standards / specifications
- Check of effectiveness
14. List of Requirements for the Process Audit

3.5 Are the personnel qualified for their individual tasks?

Requirements / Explanations

For example, responsible personnel must be considered for the following areas:

- Customer care
- Product inspection
- Storage/transportation
- Logistics
- Non-conformance analysis

Knowledge must be available for example for:

- Product / specifications / special customer requirements
- Standards / laws
- Processing / usage
- Assessment methods - (e.g. audit, statistics)
- Quality techniques (e.g. 8-D-methods, cause and effect diagram)
- Foreign languages

3.6* Is the verification for D/TLD-parts and additional legal requirements evaluated by regular Internal Audits? (*Question)

Requirements / Explanations

During the audit / verification for D/TLD all of the important features, including those specified by the Volkswagen Group, must be included.

The legal regulations regarding pollution avoidance are combined in the “List for the declarable substances in the automotive industry – Substances in components and materials” - (IMDS) and are to be considered and documented.

For example, the following must be considered:

- Audit plan
  - Complete processing of the list of requirements
    - D/TLD Formel-Q Capability or comparable (see section 14)
    - D/TLD minimum archiving period of 15 years
- Definition and tracking of the improvement programmes
- Involvement of the sub-contractors
- Written confirmation of compliance with legal requirements of parts, assemblies etc.
- Data on IMDS complete and up to date
- Volkswagen standards, especially Volkswagen 911 01, material list see IMDS ([www.mdsystems.com](http://www.mdsystems.com))
- Specifications, sampling documentation for Volkswagen Group
- External qualification of at least one top management team member for the basics about product safety and product liability law.
14. List of Requirements for the Process Audit

3.7 Does the Packaging and the Identification of the containers as well as the data exchange (B2B platform) comply with the customer requirements?

The Volkswagen Group communication platform can be found under:
www.vwgroupsupply.com

Requirements / Explanations

For example, the following must be considered:

- Suitability of packaging, fixing, padding/protection
- Technical condition (closure / locking mechanism)
  Damage, occupational safety, cleanliness
- Identification according to customer specifications
  (material card acc. to VDA 4902), plausibility (barcode contents)
- Position of the identification (card pocket / support bracket)
  Removal of invalid identification labels
- Transfer of data (e.g. data transfer acc. to DFÜ VDA standard 4927)
  (according to „EDI Implementation Guidelines“ Volkswagen AG)
- Released access to the VW Group communication system (B2B-Platform) / Volkswagen interface (is the interface known?) / for location (DUNS-No.), supplier information data base (LDB) maintained?
- Is there a person assigned for product safety / liability on the LDB?
15. List of Requirements for Mandatory Documentation D/TLD-Parts

1. Technical documentation / verification

Special documents and verification documentation of all of the product and process development phases as well as the series production of the product are very important for the requirement to submit verification. The supplier must completely list, document and archive all of the quality related documentation. The supplier must be able to prove that they fulfill all of the customer specific mandatory documentation for which verification audits are compulsory. The same procedure must be applied to sub-contractors.

The supplier within the scope of their parts is responsible for ensuring that other important features, which they have identified as a result of their experience, are included in the mandatory documentation, even if they are not required by the customer.

The systematic must be applied for all D/TLD-parts supplied. The verification must be conducted by a self audit with up to date documentation, assuring that the D/TLD characteristics are verified at least once annually for each production location (see section 8).

1.1 Does an up to date list exist, (supply list: “Documented Safety Critical Parts for Volkswagen Group”) and are technical documents for D/TLD parts available with valid change status, are they identified as D/TLD documents (*) and are the D/TLD characteristics specially identified as well?

Requirements / Explanations

To be considered are all documents (documents and records) for example:

- Supply volume / contents
- Process planning, process control
- Production control plan
- Operator instructions
- Documents / records for employee qualification, etc.

*Note:
If the supplier uses a different identification systematic for his documents and records, he must provide a correlation matrix for the above identification requirement (e.g. overview matrix with identification symbols for all customers and internal identifications) as a controlled document.

1.2 Does the parts manufacturer document those characteristics, which are not identified in the VW Group documents as D/TLD characteristics, but which are regarded as safety relevant according to the manufacturer’s product responsibility?

Requirements / Explanations

To be considered are characteristics as e.g.:
- Material, Function, Flammability (TL1010), identification, product acc. to specification
- Life span, reliability
  (see also VDA volume1 and volume 6.1 - element 6).

Note:
All features from 1.1 and 1.2 further will be comprehensively called “document liable” characteristics.
15. List of Requirements for Mandatory Documentation D/TLD-Parts

1.3 Is procedure documentation available?

Requirement / Explanations

Affects all documents with regard to procedure for mandatory documentation for parts / products and quality assurance with verification of initial and change releases (see also VDA volume 1 and volume 6.1 - element 6).

Requirement for the management is a list of all produced D parts for the production site.

Note: The list can be waived, if all products at the manufacturing site meet the requirements of the D parts management.

1.4 Does the supplier archive the related production and technical inspection documents safely and for at least 15 years? (total usage and archiving period acc. to VDA Vol. 1)?

Requirements / Explanations

Later alteration of the documents must be prevented e.g. by micro-film copies, CD-ROM. The archiving must be performed with fire / theft protected (see also VDA Vol. 1).

1.5 Is all important data contained in the documentation?

Requirements / Explanations

The following, for example, must be considered:
- Part origin / master data (including change status)
- Inspection characteristics (Set / actual values)
- Reliability inspections / tests
- Remarks on deviating results with corrective actions

1.6 Is the archiving performed in a way, that rapid access to individual documents is possible?

Requirements / Explanations

Archiving must enable allocation to lot / batch number in the product and inspection documents throughout the entire manufacturing chain including sub-contractors production.

1.7 Are the sub-contractors that influence the characteristics for which mandatory documentation is compulsory, obliged to carry out similar verification and are these requirements proven to be fulfilled?

Requirements / Explanations

For example, the following must be considered:

- Purchase contract
- Quality agreement
- Inspection / test certificates
- Agreement / contract guidelines for the interfaces of documentation
- Evaluation of compliance (e.g. by audit at the supplier)
- Frequent requests for D/TLD Audits with up to date documentation for specific D characteristics of sub-contractors.
15. List of Requirements for Mandatory Documentation
D/TLD-Parts

1.8 Is there a product safety parts representative and a deputy for each step of the supply chain assigned (see Formel-Q Konkret section 4.2)?

- External qualification of at least one top management team member about the basics of product safety and liability law.
- Up to date job role responsibilities on the supplier database (www.vwgroupsupply.com) updated by the supplier, at least one quality management representative, product safety representative, as well as his deputy.

2 Product and Process

The qualification / capability of the various processes and parts testing are important for fulfilling the product quality requirements. In this case, verification proofs must be produced. Documentation regarding planning activities, risk analysis, selection and qualification of personnel, proof of quality capable test routines, test equipment and the environmental compatibility of the materials and process mediums must be included in the verification documentation. Traceability of parts and used materials back to the processes originally applied must be guaranteed under all circumstances.

2.1 Are all important production parameters for the mandatory documentation characteristics established in writing and is their inspection regularly documented?

Requirements / Explanations

The following is, for example, to be considered:
- revolutions, feed rate, pressure, temperature
- tool parameters
- chemical fractions in liquids

2.2 Has the process capability regarding the mandatory documentation characteristics been proven or is a full inspection performed in the absence of capability verification?

Requirements / Explanations

$C_{pk} = 1,33$ for series production launch and continuous improvements, short term capability $C_{mk}/P_{pk} = 1,67$

2.3 Are the inspection procedures for mandatory documentation characteristics suitable to find defects?

Requirements / Explanations

For example, the following must be considered:
- Verification of capability for inspection / measuring equipment
- Accuracy adapted to the required tolerances
- Maintenance, calibration
15. List of Requirements for Mandatory Documentation
D/TLD-Parts

2.4 Is the traceability for mandatory documentation parts guaranteed?

Requirements / Explanations

Part inspection documents and delivery documents must be marked up in such a manner, that traceability to production period and conditions is ensured.

For example, the following must be considered:

- Identification on the product (Group standard VW 105 00)
- Coding on vehicle parts (VW 01064)
- Manufacturer code, identifiable on the part / assembly
- Parts source data, production date, batch number
- Delivery date, delivery note number

2.5 Are all mandatory documentation characteristics sufficiently taken into consideration / complied with?

Requirements / Explanations

For example, the following must be considered:

All mandatory documentation characteristics, from different product groups.
3 Personnel

A member of the company's management must have knowledge regarding the current legal requirements (countries where the vehicles of the Volkswagen Group are distributed) in regards to product liability and product safety, and demonstrate compliance for their company. Management and personnel employed for the production and testing of parts and components must be qualified in-line with their special responsibility. The employees must be clearly informed about the risks involved if important product and process features are deviated from. Foreign employees, independent from the management level, who do not understand the language of the country in which they are a resident, must be qualified and trained in a language they can understand. Personnel qualifications are to be maintained by continuous training and must be documented in a form of proof of suitability. A reserve of suitably qualified personnel must be available so that they are available when extra resources are required.

3.1 Are personnel who decide / perform / influence / confirm the mandatory documentation characteristics, trained in their responsibilities?

Requirements / Explanations

Personnel must be instructed about the requirements to adhere to laws, effects of deviation / non-compliance, responsibilities, information flow, quarantining, identification (required values, reports, confirmation in writing)

3.2 Are the associated documents / instructions for foreign personnel, independent of their level, available in an understandable language?

Requirements / Explanations

For foreign operators and, for example, inspector’s documents must normally be in their own language, for management normally in their own language or English. Alternatively proof of language knowledge (for example language certificate / domestic school degree).

3.3 Is the qualification of management and suitability of personnel proven for their particular task or function?

For example, the following must be considered:
- External qualification of at least one top management person regarding the principle of product safety and product liability rules (National, EU, USA, and Japan)
  - by legal experts (seminars, lawyers, etc.) as well as internal knowledge sharing.
- External and internal qualification of all personnel responsible for quality and coordinators.
- Qualification for the process
- Verification through training and random sample checks thereafter

3.4 Are there sufficient personnel capacities available?

For example, the following must be considered:
- Coordination of all activities regarding the mandatory documentation
- Required capacities for operators and inspectors
- Qualified operators as substitutes
16. List of requirements Technical Supplier Review (TRL)

16.1. List of requirements

1. Are the technical documents available with valid change status (drawing, technical requirements, test requirements, BMG release, first sample approval, packaging requirements, etc.)?

Remark:
Engineering approval (BMG), Initial Sample Approval test report (EMPB), technical documentation (TLD) – characteristics, IMDS inputs = International Material Database System, access to B2B-Platform, packaging requirements, up to date QM-system certificates.

Note: Releases are location specific.

2. Does the supplier document the history of the product / process and are the changes that have been released agreed by the customer?

Remark:
No release of changes by engineering (BMG) and first sample approval unless authorized via a deviation. This also includes process and system changes (modules and complete assembly groups).
Note: Releases are location specific.

3. Is there a system for risk assessment in place and are quality performance data for customer quality and warranty claims (field) sufficiently considered?

Remark:
The risk assessment should take into account experience and lessons learned from new production processes, COP-parts, concerns from the production line and field concerns as well as conclusions from FMEA and other QM evaluation methods. The supplier must define within the framework of his product responsibility and beyond the customer requirements, additional characteristics which are relevant for the process and assure these within the main value adding chain.

4. Does the supplier do regular checks according to the control plan (100% checks, SPC checks, and Product audits) during production to ensure the observance of the requirements and does the supplier file the production and technical inspection documents.

Remark:
Test characteristics, (specification / actual), results of reliability test, product audit, documentation of various characteristics with actual results.
16. List of requirements Technical Supplier Review (TRL)

5. Are all stated process parameters monitored and will production be stopped if deviations are found?

**Remark:**
Exceeding the process parameters must be identified and if they are not within tolerance the manufacturing process must be stopped.

**Note:** Changes of parameters or manual intervention into the facilities must be agreed with the process owner to prevent damage to the machinery. Recommendation: Parameter setting and adjustment shall always be done by the process owner. Intervention should not take place because of the danger of machinery damage and the prevention of unauthorized intervention must be in place (e.g. password, key etc.) then the question can be rated as 'fulfilled'.

6. Are Product Characteristics (functional and usage items) closely monitored, defects found and the defective products separated?

**Remark:**
Significant product characteristics must be monitored (automatically/manually). When discrepancies occur the affected products need to be segregated out of the production process. Here the results / lessons learned from the product audit need to be regarded.

**Note:** Interrogation of the system for robustness with faulty products must be agreed with the process owner to avoid facility damage. Also the note related to question 5 is to be applied.

7. Are the test procedures and the test equipment demonstrably suitable for monitoring the product characteristics and is there sufficient testing capacity available at the manufacturing site (internal / external)?

**Remark:**
Proof of measuring equipment capability, service contracts with external laboratories, test certificates.

8. Can the supplier prove the process capability for critical characteristics? If not, can the supplier show additional efforts to ensure the quality of the part?

**Remark:**
For serial production the process indicator is $C_{pk} \geq 1.33$.

9. Has the supplier implemented the actions shown in the last improvement programme and has the effectiveness of the actions been proved?

**Remark:**
Measures from QPN Integral, internal/external Process Audits and other customer complaints / requirements.

10. Does the supplier carry out regular internal Process Audits and requalification checks and do the related checklists include questions to items required by the customers?

**Remark:**
Internal process audits (internal production), re-qualification tests, frequency ensured by planning, content corresponds to ISIR sample report, though not submitted to customer.
16. List of requirements Technical Supplier Review (TRL)

11. Are the suppliers down in the value added chain known and ensured by the 1st tier supplier?

Remark:
Formel-Q Capability must be effective for the whole manufacturing process chain, secured by audits and / or by certificates among others (e. g. VDA 6.1, ISO TS 16949 2002).

12. Do written agreements with suppliers demonstrably exist and does the supplier monitor them?

Remark:
Coordinated quality agreements, contract agreed test specifications/ procedures.

13. Is the suitability of personnel (operator / inspector) documented to prove that they are qualified for their particular task or function?

Remark:
For specific testing (radiology, crack tests, welding, etc.) qualification records are required, for other tests (operator self-assessment, final inspection) training and proof of qualification are required.

14. Is the mandatory documentation for D/TLD parts verified/ assessed by regular internal audits and is the product safety representative entered onto the supplier data bank (LDB)?

Remark:
Planning and realisation of D Audits, when products with special characteristics are produced that require archiving. A review of the systematic should be done at least once annually. If there are no D parts at the manufacturing site, this part of the question will become non-applicable.

The supplier data base can be found on the B2B-platform (www.vwgroupsupply.com). Maintenance of data shall be conducted by a person nominated at the supplier. The administrator defines the access rights within the organisation and assures that the entries and contents are up to date. The product safety representative must be documented by the supplier on the B2B-Portal for each production site.

15. Do flow of materials, container / cases and part identification, handling and packaging, order and cleanliness fulfil the product specific requirements?

Remark:
Parts handling, identification, transport, packaging should meet the product specific requirements. Workplace, workplace environment and manufacturing conditions also should be suitable for the product group.
16. List of requirements Technical Supplier Review (TRL)

16.2. Inspection Report (Notes / Explanations)

The report is only used for a selected part. Facts or records / documentation of similar parts are not taken into consideration. For the processing of the “Inspection Report” the following must be considered:

Column “Characteristics”

Record the inspection characteristics.

Column “D/TLD”

Mark with “x”, if applicable.

Column “Cpk - Values”

Actual values for each characteristic.

Column “100% Inspection”

Mark with “x”, if checked through 100% inspection.

Column “Sample testing”

Enter number of parts tested / frequency for example 3 parts / hr or 5/1000 parts per shift.

Column “Product Audit”

Enter frequency of realisation, for example minimum once per month (consider the total amount produced).

For example once per month (consider the total amount produced)

Column “Reliability”

Enter frequency of realisation, for example minimum once per month (consider the total amount produced).

Column “Re-Qualification”, “Engineering Approval”, “First (Initial) Sampling”

The status of the results is documented in the box by the following symbols:

“X” - “completed”

“E” - “required, not yet completed”

“-” “not applicable”
Attachments

Attachment 1: Supporting Documents, Volkswagen Group Forms

I. Process and Product Audit Reports (VA/NB)

II. Supplier Self Audit (Process and Product Audit) (SL)

III. Potential Analysis (PN)

IV. TLD Self Audit / Quality Audit (DV SL)  
   (Mandatory Documentation D/TLD Parts)

V. Technical Review Suppliers (TRL)

VI. Problem Analysis (PA)

VII. Sub-Contractor Structure

The forms, in electronic form, can be found on the B2B-Platform.  
www.vwgroupsupply.com
Attachments

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Attachment 3: Abbreviation register

Abbreviations

2TP=2DP 2 Day Production Run Sign Off
8D Report Report for processing and monitoring of process and product problems (comparable with “5 Phase” on ISO/TS 16949)
Deptmt. Department (Organisational Unit)
P Procurement
B2B Business to Business (e-commerce Platform on Internet for communication between supplier and Volkswagen Group www.vwgroupsupply.com
Be On Bemusterung Online = Sampling Online
BMG Baumusterfreigabe = Engineering approval
BTV Bauteilverantwortlicher (Mitarbeiter QSK) = SQM Engineer
CAD Computer Added Design
CAE Computer Added Engineering
CAM Computer Added Manufacturing (EDV-System)
CAQ Computer Added Quality (EDV-System)
CATIA CAD System
CM Machine Capability Index
COP Carry Over Part
CPK Process Capability Index
CSC Corporate Sourcing Committee
D/TLD Mandatory Documentation / Technical Guidelines Documentation
DB Database
DFÜ Daten Fernübertragung = Data Transfer
DGQ Deutsche Gesellschaft für Qualität = German Society for Quality
DUNS-Nr Data Universal Numbering System
DV Order for D/TLD audit
EMPB Erstmusterprüfbericht = Initial Sample Report
EOP End of Production
ESL European Supplier Link (Sourcing Platform for Volkswagen AG)
EU European Union
FA Fachabteilung (z. B. Fertigung Linie X, QS Labor, Wareneingang, Einkauf) = Specific Department (e.g. production line, laboratory etc.)
FiFo First in First Out
FMEA Failure Mode and Effects Analysis
HSF Hallenstörfälle = Production line incidents
I Information (in the Flow Chart, in the flow chart, i.e. responsible person is informed or dispatched process step output document)
IATF International Automotive Task Force
IMDS International Material Data System
IO = OK In Ordnung = OK status
JIT Just In Time (logistics concept)
KVP = Kontinuierlicher Verbesserungsprozess = Continuous Improvement
CIP Process
KVS Volkswagen AG Datenbank für Technische Zeichnungen = Volkswagen Databank for Technical Drawings
LAPS Liste Ausgewählte Prozess-Schritte = List of Selected Process Steps
LDB Lieferantendatenbank = Supplier Database
LSA Lieferantenselbstauskunft = Supplier Self Information
MA Mitarbeiter = Employee
Mgmt. Management
Nb = na Nicht bewertet = not applicable
(NB = na in the audit report for elements that do not apply)
NB Nachauditätierung/-beurteilung (Prozess- und Produktaudit)
Re-Audit / evaluation (Process-and Product Audit)
NIO=NOK Nicht in Ordnung / Not OK
Attachments

Nolis  Databank for Volkswagen AG Specifications (also under standards
texts online on B2B Platform)
OEM  Original Equipment Manufacturer (Automobile manufacturer)
PA  Problem Analysis
PEP  Product Development Process of Volkswagen Group
PKS  Process Critical Serial Supplier (see Formel Q Konkret 4.11)
PN  Potential Analysis
PPS  Production Planning System
PV  Testing Standards of Volkswagen Group
Q  Quality
QFD  Quality Function Deployment
QM  Quality Management
QPN Qualification Programme New Parts
QS  Quality Assurance
QSK  QS Kaufteile Leiter des abnehmenden Kundenwerkes der Volkswagen
AG = Supplier Quality of the VW AG receiving plant
QUASI  Volkswagen Group Quality Databank system
RFQ  Request for Quotation
S  Support (on flow charts, i.e. person supporting the process step)
SL  Self Audit
SOP  Start of Production
SPC  Statistical Process Control
Stufe A  Quality Capable
Stufe B  Conditonally Quality Capable
Stufe C  Not Quality Capable, no new nominations ("Business hold")
TAD  Technical off-site service (employee of Volkswagen Group)
TE  Technical Development
TF  Technical Factor (see Formel Q Konkret)
TL  Technical Delivery Conditions of Volkswagen Group
TLD  Technical Guideline Documentation
TLD SL  TLD Self Audit Suppliers
TREAD  Transportation Recall Enhancement Accountability Documentation
TRL  Technical Revision Lieferanten  =  Supplier Technical Review
ULM  Unter Lieferanten Management  =  Sub-Supplier Management
V=R  Responsible (on Flow chart, i.e. responsible for the process step)
VA  Process Audit (includes product audit)
VDA  Association of German Automobile Industry
VP=IP  Improvement Programme
VW AG  Volkswagen AG

Abbreviations Grade of fulfillment

Teil B Seriel Production (Process Audit)

\[ E_Z \]  Completion score sub-suppliers / purchased material
\[ E_{1-n} \]  Completion score production – evaluation of process steps 1-n
\[ E_K \]  Completion score customer care / customer satisfaction (Service)
\[ E_{PG} \]  Completion score production (all process steps) for each product group
\[ E_{U1} \]  Average completion score for personnel / qualification over all process steps
\[ E_{U2} \]  Average completion score for machinery / equipment for all process steps
\[ E_{U3} \]  Average completion score for transport / parts handling / storage / packaging for all process steps
\[ E_{U4} \]  Average completion score for fault analysis / corrections / CIP for all process steps
\[ E_P \]  Total completion score per each product group (Process)

All completion scores will be expressed in percentage points between 0-100%.
Attachment 4: Definitions / Explanation Symbols

Definition of terms

1st Party Audit
Audit by internal auditor of the organisation (supplier).

2nd Party Audit
Audits by customer (OEM).

3rd Party Audit
Audits by independent certification organisation (accredited)

Supplier:
The term supplier is equivalent with the term direct supplier (1st tier) in the Formel Q. It describes the organisation, which receives an order from Volkswagen Group and therefore is a contract partner to Volkswagen Group. The ISO/TS 16949 defines it as “Organisation”.

Direct Supplier (1st Tier Supplier)
Direct supplier is the contract partner of Volkswagen Group and the one who received the order for the delivery to the receiving plant (customer plant) of Volkswagen Group.

Sub-Contractor (2nd – n Tier Supplier)
The sub-contractor is a contract partner in the “supply chain” of the direct supplier (1st Tier supplier). The 2nd – n Tier supplier therefore is the sub-supplier of the Volkswagen Group. In ISO/TS 16949 he is defined as “Supplier”, earlier it was called “Sub-Contractor”.

Volkswagen AG:
Volkswagen Group, contains all brands and regions as well as offshore enterprises.

Auditor Volkswagen Group:
Accredited QM-Auditor of Volkswagen AG or an accredited auditor of the receiving enterprises of VOLKSWAGEN-Group.

Direct Safe Guard
The direct safeguard encompasses all improvement actions, which after detection of the problem have been agreed upon with the supplier during the TRL. The realisation must be started immediately, but it does not necessarily need to be completed until finishing the Technical Review. The corresponding realisation dates to the Improvement Programme (IP) will be defined with the supplier.

Remark:
If, during a TRL, it is found, that the product is not meeting the technical requirements, or the manufacturing process is not sufficiently in control and / or legal requirements are not met, it is essential that direct remedial action with the supplier must be defined, which has to be implemented immediately or as soon as possible.

Example for direct assurance:
- Blocking and checking stored products.
- Additional 100% inspection in production.
- Verification of the characteristics by external test laboratory.
**Mandatory documentation characteristics:**
Included in addition to the Volkswagen Group specified D/TLD characteristics, if applicable, also those characteristics that the supplier identifies as safety related and which he internally defines as mandatory review items.

**Self Audit:**
This is the process audit in the scope of self-evaluation / self-assessment that the supplier must conduct.

**Supplier Technical Review (TRL):**
This is a review of the supplier that is announced at short notice to assure that all parts and components comply with all legal and VW Group requirements at all times.

**B2B Platform, Supplier Internet Portal:** (www.vwgroupsupply.com)
This is the internet portal on which all VW suppliers, after a registration acceptance procedure, can request specific information. The suppliers can obtain the following information through this communication forum:
- VOLKSWAGEN AG Documents (e.g. Formel Q Capability, Formel Q Konkret, Formel Q Integral),
- Specifications (Online Standards),
- Quality performance data (Supplier Cockpit),
- Sourcing Requests (ESL),
- Online-Catalogue, Online-negotiation (OVS),
- Electronic capacity management (eCAP)

Consideration for a supplier to obtain contracts can only happen, if the supplier's data bank (LDB) is maintained and up to date.

**Supply Chain, Process Chain, and Sub-Supplier Chain:** The supply and process chain includes all planned and realised value adding processes and activities/services, which could influence the required product quality, as e.g.
- contracted value adding processes (e.g. outsourced process steps, relocated location, relocated production site, work benches, production partnership, wages, outworkers, contracted 3rd party at production site),
- Inspection / test services, Laboratories, Calibration Lab’s,
- Supporting functions e.g. logistic services or other service providers, who could have a direct influence on product quality or production process.
Explanation of Symbols for Flow Charts

<table>
<thead>
<tr>
<th>Explanations:</th>
<th>Symbols for flow charts</th>
<th>Erläuterungen:</th>
</tr>
</thead>
<tbody>
<tr>
<td>R: Responsible</td>
<td>Start and End of Processes</td>
<td>At this location the required document/aid will be defined, necessary for conducting process steps/making decisions to meet requirements.</td>
</tr>
<tr>
<td>S: Support</td>
<td>Operation</td>
<td></td>
</tr>
<tr>
<td>I: Information</td>
<td>Process</td>
<td>At this location the documents/ aids will be defined resulting from process steps decisions as an output (according to requirements).</td>
</tr>
<tr>
<td></td>
<td>Process (consists of numerous process steps) Interface to others description</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Improvements required?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Decision field evaluation (e.g. yes/no)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Link to process interface</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Interface to Data Server / EDV System</td>
<td></td>
</tr>
</tbody>
</table>

Figure 5: Symbols on flow charts