QUALITY ASSURANCE MEASURES FOR PROCUREMENT OF PURCHASED PARTS

INTRODUCTION

This procedure is external document provided to our suppliers.

The aim of defined requirements is to ensure that new and change projects are carried out on schedule and without any quality problems. Excelling in the automotive market while attaining growth requires investment and continual improvements of quality and delivery along with rapid and flexible reactions to change. Core principle of Vibracoustic is a Zero-Defect strategy that protects customer satisfaction. This strategy is only attainable with the active co-operation of our suppliers.

This procedure must be implemented and followed consequently for each project.

This Global Procedure is part of the framework contract with the supplier. Deviations from the defined procedure must be agreed to in writing between VC and the supplier. The existing procedure specification identifies the minimum requirements for the secure handling of new projects and series production orders. In addition, the supplier must commit to employ suitable procedures and measures which ensure that the work/product satisfies the requirements regarding quality, cost, and timely targets.

Rev.	Date	Page(s) / Chapter(s)	Modification notes
6	17.07.21	5,8-12,14,18	3.1 Special Characteristics definition, 4.1 SQMS chart revised 4.2 Certification management, 4.3 TES is included, 4.13 SW Quality req. 4.15 Capability req., 4.17 supplier change request, 5. RACI matrix updated
5	19.12.19	1-30	Chapters 4.2, 4.13, 4.15, 4.16.1, 4.16.2, 4.16.11, 4.16.14,
4	29.11.17	1-29	QM system requirements, CSR, general revision, Safety Critical Characteristic, SQMS chart, PPAP list, Tooling info, Traceability and RACI
3	06.09.16	23, 26	Quality escalation level, supporting documents, RACI
2	10.12.14	5	Emphasis Characteristics added
1	11.12.13	23	Rules for finishing 8-D-Report

Changes related to the latest revision will be identified in blue.

	Department	Date
Producer	SCM	17.07.2021
Approval Process Owner	SCM	25.08.2021
Approver Management System	QM	24.09.2021
Approver Management Board (Global Procedures only)	-	24.09.2021

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1. PURPOSE

In this procedure the procurement and quality assurance of purchased parts of production material for all VC companies is specified. Thereby we want to ensure that

- New products are launched on schedule and without any quality problems
- Quality problems are identified, and robust solutions implemented prior to series production
- Quality capability of processes are evidenced at series approval and during series production

2. SCOPE

This GP is valid for all procurement processes of production material for all VC companies with partnership production of purchasing contracts and purchasing conditions. Exceptions to this procedure must be agreed in writing. Standard products (e.g., catalogue goods, standard parts, standard colours, lubricating materials, chemicals, etc.) and intercompany business are excluded.

3. TERMS / DEFINITIONS / ABBREVIATIONS

3.1 Definitions

SQMS

The Supplier Quality Management System describes the business process of supplier selection, evaluation, and development as well as actions for the protection of new projects and series parts.

Initial Samples

Initial samples of finished product produced with the planned equipment, procedures, manufacturing staff, materials, and semi-finished products exclusively for series production. They are used for Production Part Approval Process.

FMEA

Failure Mode and Effects Analysis

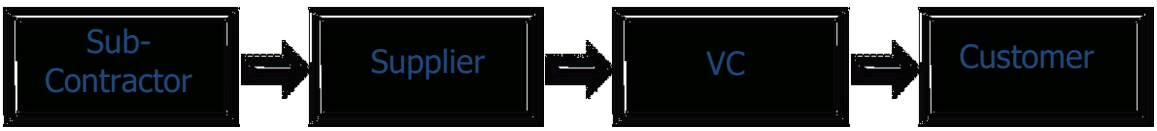
This method is described in VDA volume 4, part 2 resp. and the AIAG reference manual. OEM specific FMEA- requirements (i.e., Ford – FMEA) must be met by supplier.

Supplier

The term "supplier" refers to production facilities in this GP, not to trade organizations. Therefore, an "Approval of Suppliers" always applies correspondingly to the audited production site only, not to the general trade organization.

Sub-Contractor

The sub-contractor delivers to the supplier products or labour which have an effect to the products of VC. The supplier guarantees the sub-contractors' quality.



Production Trial Run (PTR)

Within the PTR, the systematic analysis of the first production lot (first batch) should be analysed systematically to guarantee the early and systematic process optimization and do not require the complete planned series process.

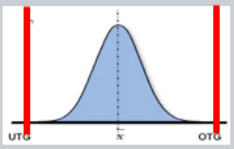
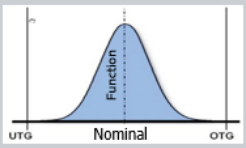
Supplier Run@Rate (SRR)

Supplier Run@Rate serve as verification of processes and products. Parts must be manufactured with operating supplies used for series production over an extended period of time (at least 300 parts or 1 shifts). With this milestone the production process will be technically evaluated (scrap, capacity) and the necessary production documents checked. If manufacturing is not possible under series conditions, the status must be communicated to VC and its effect on series production needs to be assessed.

Special Characteristics

Significant and critical characteristics are designated in the drawings using the following acronyms:

- Critical characteristics (Safety Relevant) = CC
- Significant characteristic (Fit & function) = SC
- Emphasis Characteristic = EC

	Critical Characteristic	Significant Characteristic	Emphasis Characteristic
Symbol on print	CC | 10 ± 0,1	SC | 10 ± 0,1	EC | 10 ± 0,1
Where applicable	Safety characteristic identified by the customer or internally in the D- or P-FMEA	Important functional characteristic requiring Statistical Process Control identified from D- or P-FMEA	Characteristic that does not impact fit, form or function, that requires additional control in the control plan.
Explanation	An exceedance of tolerance has a severe influence on the influence on the safe function of the vehicle or the safety of the user or passengers of the vehicle or other road users	A movement of the part away from the nominal value causes a degradation on the function and / or durability until the part is not functional at the upper or lower specification limits	The usage of the complete tolerance has no influence on the function or durability of the product, but can impact the process (Scrap, O.E.E:, etc)
Requirements	Require 100% conformance to specification Poke Yoke where possible, if capability is required it is in excess of 2.00	pp, ppk ≥ 1.67 at launch cp, cpk ≥ 1.33 on going production or 100% control until 1.33 is achieved. *Where product characteristic capability cannot be determined directly, the appropriate surrogate parameters that ensure product conformance shall be monitored for capability.	Additional care in control plan to maintain tolerances have to be agreed with Vibracoustic. Increased frequency of checks – every shift/every batch ideal Ppk >1.17 *Where product characteristic capability cannot be determined directly, the appropriate surrogate parameters that ensure product conformance shall be monitored for capability.
Visualization			

Requirement for Ppk, Cpk value may be higher as per specific Customer Requirement.

Production Part Approval Process (PPAP)

The process is designed for following purpose:

- to ensure that a supplier can meet the manufacturability and quality requirements of the parts supplied to VC
- to provide evidence that the VC engineering design record and specification requirements are clearly understood and fulfilled by the supplier
- to demonstrate that the established manufacturing process has the potential to produce the part that consistently meets all requirements during the actual production run at the quoted production rate

OEM specific requirements (PPAP acc. AIAG resp. EMPB acc. VDA2) must be met by supplier.

3.2 Abbreviations

AIAG	Automotive Industry Action Group
APQP	Advanced Product Quality Planning
BU	Business Unit
BUM	Business Unit Manager
CM	Commodity Management
CQI	Continuous Quality Improvement
CSR	Customer Specific Requirements (requirements created by VC customers)
DV	Design Verification
EMPB	Erst Muster Prüf Bericht (German)
EPC	Early Production Containment
GP	Global Procedure
HIS	Herstellerinitiative Software (German) / Manufacturer-initiative Software
IMDS	International Material Data System
IR	Inspection Report
ISIR	Initial Sample Inspection Report
MSA	Measurement System Analysis
QMS	Quality Management System
QM- Site	Site Quality Manager
PG	Product Group
PQE	Preventive Quality Engineer
PSB	Product Safety Representative
PSCR	Product Safety and Conformity Representative

PPAP	Production Part Approval Process
Ppku	Ppk (upper specification limit)
Ppkl	Ppk (Lower specification limit)
PTR	Production Trial Run
SDE	Supplier Development Engineer
SPC	Statistical Process Control
SOP	Start of Production
SQA	Supplier Quality Assurance
SQMS	Supplier Quality Management System
SPM	Supplier Preparation Meeting
SRR	Supplier Run@Rate
STA	Supplier Technical Assistance
SW	Software
TES	Technical Engineering Standards
VC	Vibracoustic
VDA	Verein der Deutschen Automobilindustrie (German)

4. PROCESS / METHOD / PROCEDURE

4.1 SQMS Supplier Quality Management System

The Supplier Quality Management System (SQMS) of VC defines the supplier selection process, the supplier development standards, and activities, as well as the specific requirements of the automotive industry.

The SQMS is fundamentally divided into 4 phases:

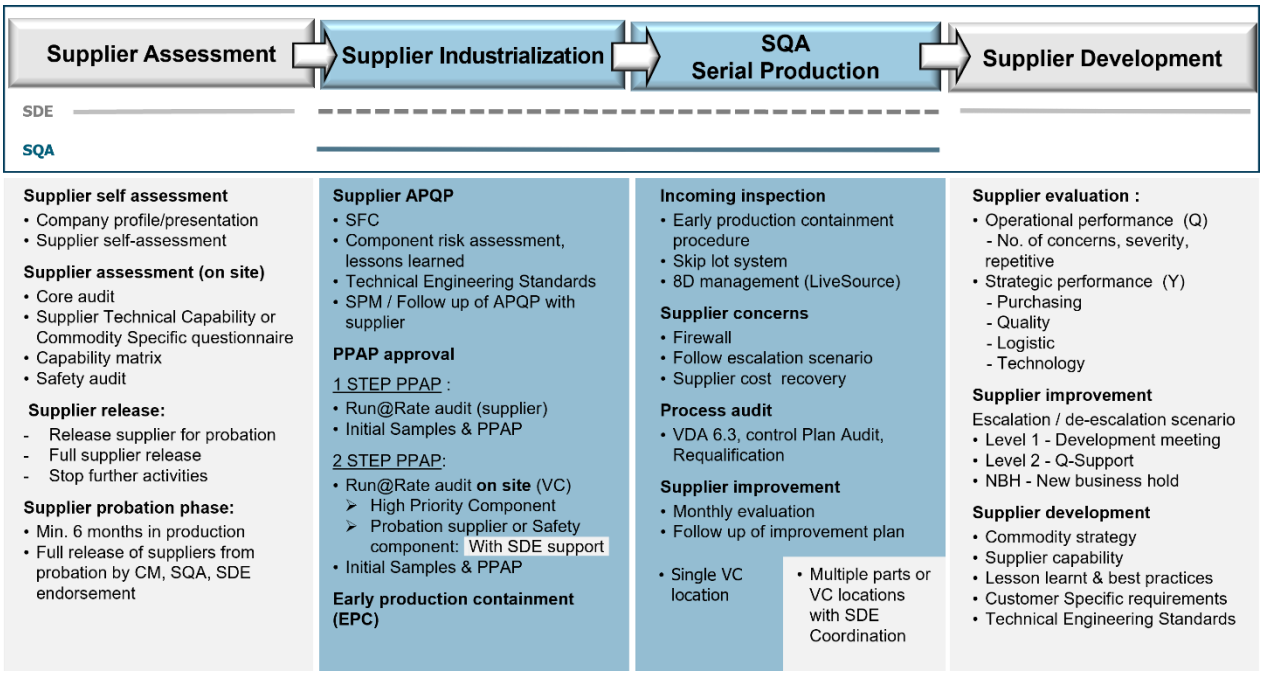
Phase 1 = Supplier assessment and approval of new suppliers

Phase 2 = Supplier Industrialization

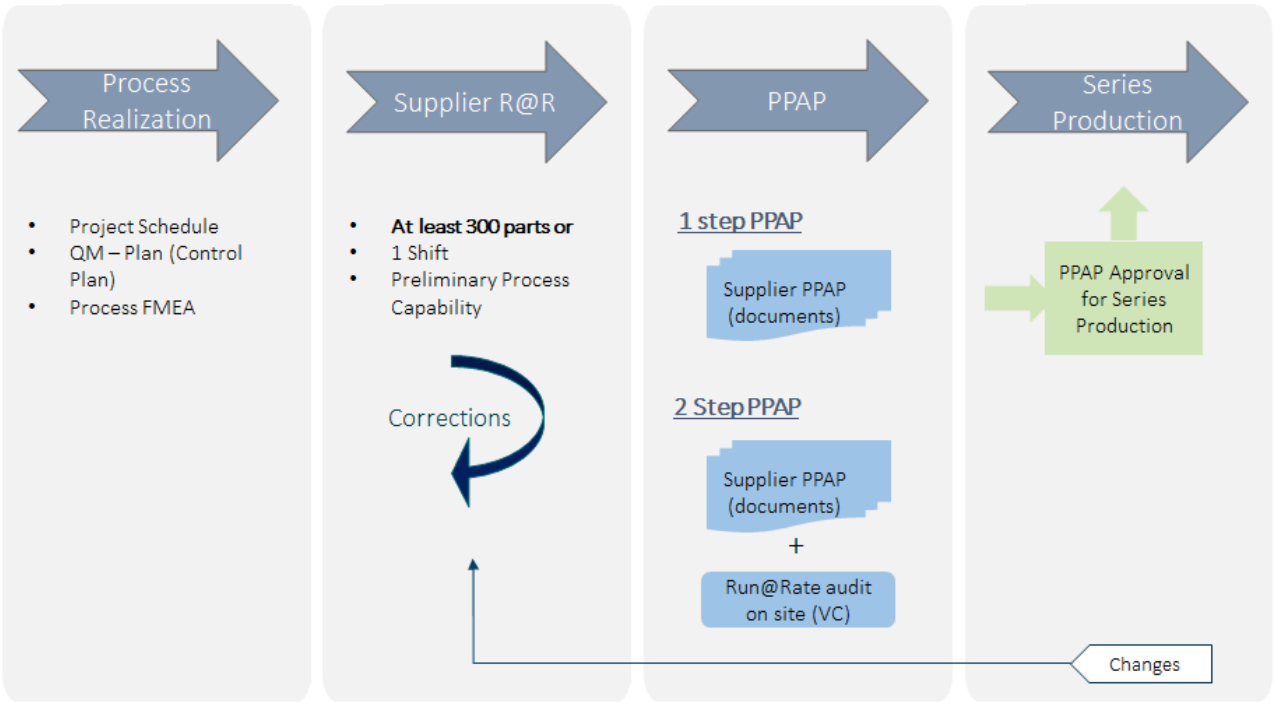
Phase 3 = SQA Series production

Phase 4 = Supplier Development

The procedure exclusively defines the APQP requirements to suppliers for purchased and serial production.



Supplier Industrialization



4.2 QM-system

Certification of QMS according to ISO 9001 by accredited body is the minimum requirement for all VC suppliers.

VC requests suppliers of productive parts and services to implement their QMS certified IATF 16949. Those suppliers not yet certified to IATF 16949 must show plan to achieve this certification.

The requirements for error proofing and inspection of production parts must be fully implemented for all VC products. The supplier must also incorporate any relevant VC / Customer Specific Requirements (may be provided by VC upon request) into its QMS system that refers to the specific product or service.

The supplier must inform VC immediately if the certificate has been revoked, placed on suspension, or expired without successful recertification.

After successful recertification, new certificates must be shared with VC electronically using VC communication platform "LiveSource"

4.2.1 Product Safety Representative

To have a fast and effective response in case of a critical situation (e.g., Safety risk) Supplier must nominate a Product Safety Representative / Produktsicherheitsbeauftragter (PSB).

If requested by CSR, the suppliers must provide the PSCR certification using VC communication platform "LiveSource".

4.2.2 Qualification of Special Processes – CQI

CQI guidelines are published by AIAG and available on www.aiag.org.

For suppliers dealing with special processes according to AIAG, relevant CQI guidelines must be considered.

The CQI self-assessments must be performed at least annually. The cover sheet and action plans to address gaps must be shared with VC electronically via VC communication platform "LiveSource".

4.3 Contract Review

The supplier is required, at the quotation stage as well as in the order phase, to check documents placed at its disposal for completeness, correctness, freedom from contradiction, ability to meet the required quality and production capability (ability to manufacture, adherence to target dates etc.). The supplier indicates to VC in writing where documents and facts are unclear, or which appear incorrect. This also applies to measuring procedures and methods.

When referring to other documents, the supplier must ensure that processing is done according to current versions of following documents:

1. Generally accessible guidelines/ standards (e.g., DIN, ISO, EN and ASTM-Norms) must be provided to confirm positions.
2. Guidelines/standards and documents of VC. These will be available on VC communication platform "LiveSource"
3. Technical engineering standards. These will be available on VC communication platform "LiveSource", e.g.: TES-50400 M04_HPDC Process Requirements.
4. CQI standards
5. Customer specific requirements (CSR), Guidelines/standards of VC customers

4.4 Control of documents

The supplier must produce, check, and deliver to the current valid version. Documents from VC and its customers must be treated as confidential. Forwarding to a third party is permissible only after consent in writing from the relevant purchasing department of VC. Archiving periods are per OEM´s customer specific requirements (CSR). For CSR´s see section 4.5.

4.5 Customer Specific Requirements (CSR)

Suppliers are expected to comply with specific requirements of VC customers.

For CSR´s refer to:

www.iatfglobaloversight.org

www.vda-qmc.de

The supplier is responsible to maintain and revise their system to the latest customer standards.

4.6 Control of materials and packaging provided by VC

The supplier must conduct a receiving inspection on materials and packaging delivered for quantity, identification, and visible damage. The consumption of delivered articles must be recorded on the delivery documents and the responsible purchasing/logistic department notified.

4.7 Environmental protection

The supplier must ensure that all materials used in production meet the valid, legal requirements for restricted, poisonous, and hazardous materials. In addition, regulations for environmental protection must consider the country of manufacture and the customer. Customer Specific Standards and Requirements must be considered for the specific process and product.

4.8 Audits

The supplier must audit its QM-System at regular intervals for effectiveness and compliance to the requirements described in this procedure. VC is entitled to carry out – if necessary, with the customers, audits at the supplier and at its sub-contractors – after appointments are made. The supplier must support VC in carrying out the audit into the required procedures, data, and records for analysis of the Quality Management System. VC will maintain the supplier's confidentiality.

4.9 Staff

The supplier must demonstrate that all employees who work in the areas of planning, production and inspection are qualified.

4.10 Equipment

The supplier must ensure that suitable test equipment for carrying out inspections defined in drawings and its referenced documents are available and that the equipment is maintained in proper condition. The suitability of inspection equipment, which is used for testing important characteristics, is to be verified and records retained (AIAG MSA Manual or VDA Manual 5).

4.11 Qualification of sub-contractors

VC may provide approved sub-contractors. The supplier is responsible for selecting suitable sub-contractors when VC does not assign one. Regardless, the supplier must evaluate the quality efficiency of his sub-contractors and adequately integrate them into the APQP process. The Production Parts Approval Process (PPAP) must be fully applied at sub-contractors. The supplier must ensure that sub-contractors refer to 4.17.13 requirements of this procedure. In any case, the supplier is responsible for the entire quality performance of the sub-contractor.

4.12 Safety data sheets / Processing instructions

Where applicable and without being solicited, the supplier must provide complete and up-to-date safety data sheets and process instructions before supplying product.

4.13 Software Quality Requirements

If the supplier is developing and/or flashing software for/to VC components, following quality measures need to be respected:

4.13.1 Software Development

The supplier must present the Supplier self-assessment (LiSA) according to HIS standard.

In case the suppliers' part includes software, the software development shall comply with A-SPICE or comparable. The supplier must support an assessment with an assessor nominated by VC.

In case the supplier part includes safety related software, the software development must comply with ISO 26262.

The target for the capability level must be agreed with the responsible SQATC/PQE during nomination phase. Recommended minimum is level 2 (managed) or higher as per Customer Specific requirements.

4.13.2 Software Flashing

The correct transfer of the software between supplier and VC must be verified by check sum control.

The supplier must ensure that only the latest and approved SW is used in production.

For serial production, the supplier needs to ensure and prove that the supplier's tools chain used for flashing fulfils the level of confidence in the use of tools requested by ISO26262.

4.13.3 General Requirements

For suppling hardware (from inhouse production) plus software to VC, the supplier must have a valid IATF16949 certificate (that includes SW development).

In case supplier is only programming software, the organization should follow IATF MAQMSR approach.

In case of CC of functional characteristic, a 100% functional end of line test must be performed.

Depending upon individual usage of the component there can be additional quality requirements from VC. All requirements from specification or drawing needs to be respected.

4.14 Advanced Product Quality Planning (APQP)

The supplier must utilize measures and procedures which ensure that the details of the contract, without any deviations in respect to quality, target dates or work volume, are met.

It is recommended to use the AIAG/VDA procedure.

A project time schedule must be created with consideration for the following items:

1. Milestones such as:
   - Design validation including prototype delivery and testing; only if applicable.
   - Supplier Process design review: Revision of tool design and project maturity before tool production. F0-01-7.0-0217 to be submitted by supplier.
   - Supplier process readiness: To be performed after first PTR. Possibility to produce, defect rate, status of equipment etc. FO-01-7.0-0237 to be submitted by supplier.
   - First off tool parts delivery
   - Run@Rate: see chapter 4.15
   - PPAP submission: PPAP samples delivered and required documentation uploaded to VC communication platform "LiveSource"
2. Individual measures such as:
   - production equipment and production tool planning
   - procurement of purchased ancillary items
   - Development of the Process-FMEA
   - Development of a control plan for prototype, pre-series, series
   - Production Trial Run
3. Responsibilities

   Responsible persons must be listed by name and contact data (phone, mobile, email)
4. Start and end date of individual activities

   Project schedules should be structured in suitable format (e.g., MS-Project, etc.).

4.14.1 Control Plan

All controls for product and process characteristics, test equipment, testing intervals, test volume, form of the records and reaction plan must be defined for pre-series and series production.

The Control plan must reflect the entire process chain of contracted part-number, including outsourced processes. The Control plan of the subcontractors must be provided to VC upon request.

All Control Plans must have a yearly re-qualification requirement, and the supplier must have the information available for VC upon request.

Control plan pre-series:

Suppliers should utilize an Early Production Containment Plan (EPC) (see enclosure. Nr.2)

Control plan - series:

The series control plan contains all tests and process controls from receiving inspection of parts from sub-contractors to supply VC as well as the scale of requalification tests.

Revision of the control plan:

The production control plan, which is approved by VC within the EMPB/PPAP procedure, is binding for the entire lifetime of the product. Changes, which are relevant for method and scale of inspections, must be approved by VC prior to implementation. In case of a loss of quality or product risks and process risks not defined by the approval time, VC reserves the right to amend the QM schedule corresponding to needs.

Form and content of control plan:

Content of control plans must be adopted according to the regulations of IATF 16949 latest revision, or AIAG.

4.14.2 Process Flow Chart

A process flow chart must be compiled for the whole manufacturing process. The process flow chart must be sent to VC as part of PPAP package. The process flow chart must reflect entire process chain of contracted part-number, including outsourced processes.

Process flow chart must be submitted with every supplier final offer to VC. Draft may be accepted at this time.

Remark: The process number sequence must be the same through all documents (Flow, Control plan, FMEA)

4.14.3 Process-FMEA

The Failure Mode and Effects Analysis must be carried out before series production as a method of proofing. To minimize potential cost and conduct appropriate corrective actions if needed, the FMEA should be developed at the earliest possible time in the APQP process.

PFMEA must reflect entire process chain of contracted part number, including outsourced processes. Method and formal structure must correspond to VDA 4, Part 2. OEM specific FMEA requirements (i.e., AIAG FMEA manual, Ford FMEA ranking system) must be assured by supplier.

A prerequisite for a production parts release (initial samples approval) is the supplier's confirmation that the required Process-FMEA has been carried out on the first sample test report. On request the FMEA must be provided for review or presented at VC site.

4.15 Supplier Run@Rate

A supplier Run@Rate should consist of at least 300 parts or one shift of uninterrupted production. However, VC may change the length depending on several factors: product complexity, cost, production day length, previous history of similar product, processes, application, or supplier history. The supplier Run@Rate run is to manufacture under series production conditions (staff, material, machine, tools etc.).

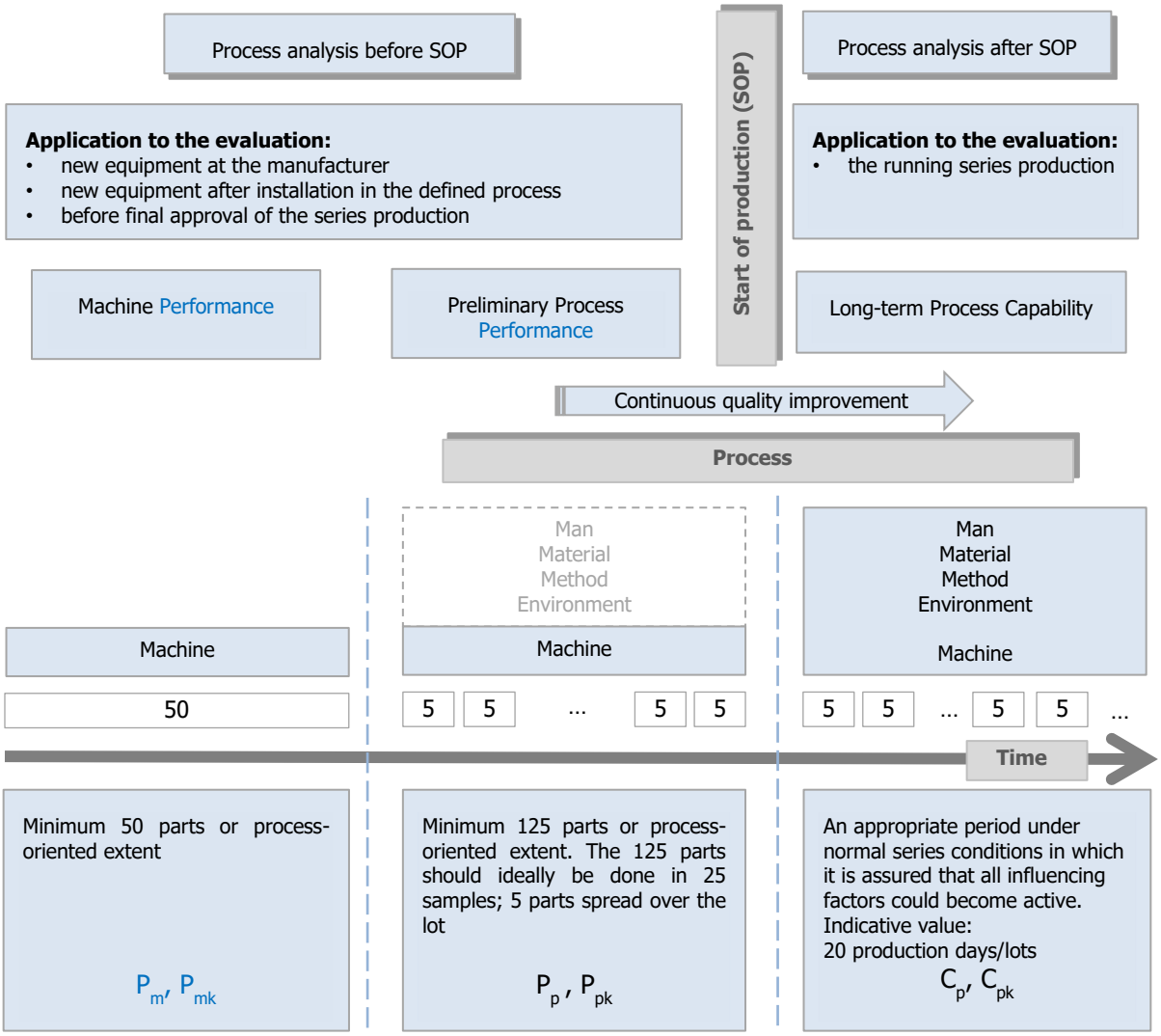
Before series production the capability of important features must be proved during supplier Run@Rate. The VC approved methods, processes and materials mentioned below must be used for this evaluation.

Supplier Run@Rate is performed in the following ways:

- Self-Run@Rate process audit according to FO-01-7.0-0103-Run@Rate Suppliers-full audit questionnaire
- VC or external auditor will perform the Run@Rate audit at the supplier (upon VC request), according to FO-01-7.0-0103-Run@Rate Suppliers-full audit questionnaire

Method for capability evaluation:

'Zero defects strategy is only possible with controlled quality – efficient processes'



Machine Performance

The study of machine performance determines the suitability of the manufacturing equipment for production task.

Sample size: At least 50 parts from continuous production run in an uninterrupted sequence must be measured.

Machine performance (Pm, Pmk): A machine performance of Pm, Pmk ≥ 1,67 for significant characteristics is required (or higher as per specific Customer Requirement).

Note: [ISO 22514-3] uses the indices Pm & Pmk in place of Cm & Cmk, denoting Machine **P**erformance.

Preliminary Process Performance

Preliminary process performance is determined on one lot (pre-series/production trials), providing only an initial assessment where systematic influences between the individual lots (human, material, etc.) are not taken into consideration.

Sample size: At least 125 parts must be sampled over the entire pre-series production lot and tested. If the tools have more than one cavity, an equal distribution of all cavities must be assured.

125 samples = 25 subgroups of 5 parts. We recommend the following rule for sampling as preliminary study.

Collect 5 parts, skip 5 parts, collect 5 parts, skip 5 parts, etc.... In cases of multiple cavities, we accept 125 samples for 1 feature if samples from all cavities are randomly selected. If capability is not OK, supplier demonstration of capability per cavity is acceptable. All distributions must be normal (and process data is statistically in control and stable).

Samples Records: Individual values must be recorded (test records) and may be viewed by VC upon request.

Preliminary process performance (Ppk): To fulfil the demand for a "Zero Defect Objective" a Ppk>1.67 for significant characteristics is required (or higher as per specific Customer Requirement).

Example for P_{pk} requirement:

Pp and Ppk > 1.67	Process meets requirements in pre-series. Process probably meets requirements in series production.
Ppk < 1.67	Process does not meet requirements **Measures:** Characteristics must be 100% inspected Optimize process to Ppk > 1.67

P_{pk} = smaller of the values P_{pku} and P_{pkl}

Capability Records: The preliminary process capability study is part of the production parts inspection procedure as per AIAG – PPAP and VDA 2 and must be submitted to VC as part of PPAP package.

Long Term Process Capability

The results of the long-term study during series production reflects the real capability of the process. Here all influencing factors become active and it must be possible to detect their effects on the manufacturing process. The process capability must be constantly monitored and documented in running production.

Sample size: At least 125 parts with 25 subgroups of 5 parts over a sufficiently long period of time (e.g.: 20 production days / lots)

Process capability (Cp, Cpk): An ongoing process capability of Cp, Cpk ≥ 1.33 for significant characteristics is required (or higher as per specific Customer Requirement).

Some customers might request higher preliminary and long-term process capabilities. Information about deviating capability requirements to the above-mentioned standard requirements will be communicated during the project.

If process capability cannot be reached a reaction plan must be agreed upon with VC Supplier Quality.

4.16 Production Part Approval Process (PPAP)

Through the Production Parts Approval Process (PPAP) it should be proved whether the product can be reliably manufactured within the defined properties or not. The approval process can be carried out in different ways depending on product and project risk. Depending on the Risk Assessment results, Vibracoustic determines the supplier deliverables for the supplier PPAP approval:

1 Step PPAP requires the Standard PPAP elements as mentioned into 4.16.1. The supplier produces the defined PPAP documents and delivers them to VC together with the PPAP samples. The series release (PPAP Approval) is given after receiving correct and complete PPAP reports and approving the dimensional and functional characteristics.

2 Step PPAP requires a supplier Run@Rate audit on site performed by VC staff or an external agent. The series release (PPAP approval) is given after the supplier receives the approval of successful Run@Rate audit using 'FO-01-7.0-0103 Run@Rate Suppliers on site' and after receiving correct and complete PPAP reports and approving the dimensional and functional characteristics.

Supplier is notified if a 1-Step or 2-Step PPAP is required including necessary documents prior to or with the PPAP purchasing order.

For critical or safety critical purchased parts (cc = critical characteristics) the 2 step PPAP is mandatory.

4.16.1 Requirements for series production release

The submission or evidence of the following measures and results are required for release of production parts. Less requirements might be defined by SQA.

Submission	Provided by	
Process Flow Chart	Supplier	
FMEA	Supplier	
Vibracoustic drawing Mapped/Ballooned	Supplier	
Control Plan Early Production Containment Plan	Supplier	

Measurement System Analysis (MSA, Gauge R&R)	Supplier	
Supplier Dimensional report (Vibracoustic Print Mapped/Ballooned with Results)	Supplier	
Records of Material/Performance Test Results (Material certification, corrosion testing...)	Supplier	
Initial process studies for CC, SC, and EC characteristics: C_p, C_{pk} / P_p, P_{pk}. (Recorded in FO-01-7.3-0216)	Supplier	
Master samples (min. one sample/cavity, min. 2 pcs stored at supplier location for entire project life)	Supplier	
PPAP samples (1 per cavity, min. 6 samples; marked; with single measurements results)	Supplier	
300 pcs for PTR delivered. Delivery marked with PSW cover sheet	Supplier	
Run@Rate audit (Supplier) (Full audit including capacity analysis using FO-01-7.0-0103)	Supplier	
Run@Rate audit (VC) (Full audit including capacity analysis using FO-01-7.0-0103)		VC
Packaging Agreement (Shipping Standards)	Supplier	
IMDS	Supplier	
Approval of sub-suppliers - PSW/EMPB (FO-01-7.4-0335_ Sub-Supplier-Tree)	Supplier	
Part history sheet	Supplier	
Photographs of tools including gages and assembly equipment	Supplier	
Vibracoustic dimensional report		VC
Successful Production Trial Run, assembly of product at VC		VC
Part Submission Warrant PSW/EMPB	Supplier	
Delivery approval PSW/EMPB		VC
Others e.g.: Documented approach for warranty analysis (for functional components), Software specific deliverables, Appearance approval report, Archiving plan for safety parts, etc.)	Supplier	

Notes:

Part submission Warrant: In cases where the customer requires his own forms for supplier PPAP, the required forms must be used.

Dimensional Results: Measurement results must be assigned to the individual parts

PPAP documentation must be sent to VC through VC communication platform "LiveSource". The delivery of PPAP samples must be clearly labelled as PPAP samples, separated from the series delivery.

Each pallet to be marked with "FO-01-7.4-0146-Shipment Marking Triangle".

PPAP samples may not be packed together with series parts at any time.

4.16.2 Production Parts Approval

No series parts may be supplied to VC before approval. Permission regarding deviations (enclosure Nr.7) will be granted should series deliveries be needed for reasons of timing (see Item 4.17.11).

4.16.3 Tooling information

A tooling data sheet with detailed tool lists and related information such as tool type, number of cavities, tooling concept, dimensions, tool life, capacity, machine data etc., along with photographs of the tool tag, the entire tool in open position – visible cavities/form must be provided by the suppliers to VC in the format requested by VC. Points to note here are:

1. Vibracoustic (or Customer) paid for tooling must be identified as per Vibracoustic or customer specific instructions.

- Detailed instructions for individual customers are available upon request (contact assigned SQA).
- Check customer specific submission requirements before submitting photos.
- Any photos that do not follow customer specific requirements or are not clear/legible will not be accepted.

2. Details described in point 1 must be submitted for every single tool or fixture.

4.17 Series production

The supplier must keep latest PPAP approval condition such as described in 4.16.

Any proposed changes must be notified to VC in writing min. 3 month in advance using the form FO_01_7.4_0300 (Supplier Change Request). This must be submitted to the program buyer, to be championed on the VC side. Without this formal request from the supplier no change will be considered or allowed until the supplier has an approved Supplier Change Request. This approval must be obtained before start of implementation of the change. The responsible SQA of receiving plant will determine the necessary requirements and PPAP documentation to be provided for approval.

Any cost impact related to the changes (testing, PPAP to customer …) may be charged back to the supplier.

The Production Parts Approval Process (PPAP) must be carried out by the supplier in the following cases:

- new project / sampling (repeated sampling)
- amendments to product design / material
- changes in production process
- transfers to other production locations
- transfer of lines in the same production site
- use of new tools and cavities
- use of different machine
- use of new suppliers
- interruption in production for longer than 12 months
- additional IATF and Customer specific requirements to be considered

4.17.1 Test records

The supplier must maintain production records as described in the control plan. These test records must be assigned to individual production batches. Test records must be archived for at least 5 years after end of production (or according to specific requirements of VC customers, legal requirements). Test records of safety parts (A-Parts) must be kept for a period of 15 years after end of production. Test records must be available for review at any time by VC.

4.17.2 Early Production Containment (EPC)

Suppliers must install the Early Production Containment Plan for all pre-production deliveries and for the production ship quantity and duration specified by EPC guideline. Minimum qty. is 10 X daily production volume calculated from average weekly demand. Suppliers must follow VC EPC guideline OPI-01-7.4-0015. EPC results are to be recorded in FO-01-7.4-0149.

4.17.3 Requalification Test

An annual requalification is required. The requalification includes functional testing required on the drawing, a full dimensional layout, capability analysis and material certification consistent with records submitted at PPAP. Recent test / capability data and layout results are acceptable.

As per 4.14.1, yearly requalification must be mentioned into the control plan.

4.17.4 Zero defect – continuous improvement process

To minimize quality risk and to avoid waste (scrap, rework, test expenditure, etc.), the supplier evaluates process and product on a regular basis and introduces measures for continual improvement.

The quality objective for all suppliers is „Zero Defect". Each supplier is expected to develop necessary actions in order to achieve this „Zero Defect" target.

VC conducts supplier performance evaluation on regular basis. Results from the evaluation will be used as a basis for escalation or development activities.

4.17.5 Traceability

Suitable identification systems must be applied. The test results of a part must be traceable. The batch nr. and production date must be noted on the delivery note. Supplier must be able to trace back the following information for the produced parts:

- VC Part number
- Drawing index
- Production Date / Production Batch
- Production Line / Machine
- Material Batch

During production, the following must be secured:

- FIFO (First-in First-out)
- Identification of part status (Finished/unfinished, checked/not checked; OK/NOK)

4.17.6 Identification of containers, delivery notes, labelling and transport orders

The supplier's packaging must be clearly identified with the correct and legible material tag.

Detailed requirements for Delivery notes and transport orders are also described in VC General Procedure (GP-01-7.4-0009).

4.17.7 Packaging

Packaging of products must be agreed by VC and documented as part of the PPAP records. This should comply with the overall Logistics requirement for suppliers.

4.17.8 Receiving inspection by VC

VC does not conduct receiving inspection of characteristics that the supplier is contracted for. Only product identification, shipping documents, and transport damage is reviewed. In any cases, Supplier liability of defective goods remains according to VC general terms and condition of purchase.

4.17.9 Non-conforming parts

Should faulty parts be found at delivery and/or in production process, it may result in the return of the entire delivery. As soon as the supplier is notified, the supplier is obligated to ensure no further defective parts are delivered, by establishing containment activities. Stocks of finished parts must be inspected or replaced with certified material and corrective actions initiated.

The supplier is required to inform VC immediately when faulty products have been released for delivery. VC reserves the right, in case of a line stop to directly arrange inspection and rework, and to charge any expenses incurred by VC to the supplier if the supplier fails to respond to VC within 1 hour. For each complaint, the supplier will receive a notification. The 8D methodology is required utilizing VC's communication platform "LiveSource" for documenting the corrective actions. A Problem-Solving-Process sheet (FO-01-8.5-0160-PSP-Supplier available on "LiveSource") must be used and submitted to VC for repetitive complaints and complaints from VC customer. For any other complaints PSP must be used on VC request.

The containment action must be submitted to VC within 24 hours. The permanent corrective action must be completed within 10 working days after the initial notice. Extra time is possible when a defect sample part is necessary for carrying out the root cause analysis but is not available.

The risk analysis (FMEA) must be reviewed as part of the corrective action. Additional analysis and documentation may be requested by VC based on the severity of the non-conformity.

4.17.10 Settlement of cost

VC reserves the right to charge verifiable complaint related cost incurred, back to the supplier. Refer to LI-01-7.4-0016.

4.17.11 Permission for deviation

VC may grant deviation to certain process / product requirements when the deviation does not violate VC's customer requirements, affect durability, nor any governmental / regulatory requirements. Supplier request the deviation using the form mentioned in enclosure Nr.7. Any deviation will be limited in scope, duration and/or quantity and the appropriate deviation form shall be fully signed and approved. Product shipped under a deviation must be keep separate and clearly identified in delivery. Every rework process of parts must be released by permission of deviation.

4.17.12 Quality performance

The quality performance of a supplier will be evaluated in two steps:

1. Ongoing, based on
   - number of supplier concerns (complaint notifications)
   - ppm (rolling over a defined number of months)

2. Long term, based on
   - Severity of fault
   - Repeated fault
   - PPAP performance
   - Result of Process Audit
   - Customer focus in case of complaint
   - Professionalism, in time failure analysis and implementation of sustainable measures

4.17.13 Quality Escalation Process

In case of ongoing poor quality or lack of support, supplier is escalated and Vibracoustic will initiate supplier improvement activities.

- Escalation Level 1: Status "Quality Development".
- Escalation Level 2: Status "Q-support": VC or an external consultant will drive the improvements at the supplier.
- NBH: New Business Hold

Escalation activities Level 1

1) Initial meeting:
   - The supplier shall submit the action plan (using FO-01-7.4-0061) three business working days in advance so that all participants can be prepared for the meeting.
   - During initial meeting target agreements and exit criteria are agreed
   - Supplier presents the Action Plan covering following three areas:
     - Part specific improvements (based on rejections during the last 3 months)
     - Systematic improvements (based on rejections during last 12 months)
     - General improvements

Part specific Improvements	Systematic Improvements	General Improvements
- Review closed 8D's - Review open 8D's - Review firewalls & effectiveness - Global actions?	(Based on VC Complaints in the last 12 months) - Failure types - Root causes - Actions to address main failure types and root causes for all parts / materials.	- Management - Systems - KPI's - Personnel & training - Lesson learned - Logistic - Miscellaneous

2) Follow up meetings:
   - Supplier is responsible to provide updated action plan and evidence during Vibracoustic periodical reviews and upload it in "VC Communication platform LiveSource"
   - Meeting minutes tracked by SDE in "VC Communication platform LiveSource"
3) Decision to escalate or deescalate:
   - Linked to achievement of exit criteria agreed in initial meeting and Vibracoustic team approval
   - Final decision communicated by SDE and CM to supplier with FO-01-7.4-0064

Additional activities for Escalation Level 2

- Firewall at supplier and/or VC
- Quality Control by independent source

- Process audits by VC or independent source
- Problem solving support with respect to technical and quality system improvements
- Support in optimization and improvement of machines, process, tools, controls, and personnel
- All support costs during Q-support shall be documented and charged to the supplier.
- Weekly follow-up and reporting

4.17.14 Subcontractor

For series deliveries it is only allowed to consider subcontractors, whose parts have been used for PPAP to VC. The Subcontractor must submit a PPAP to the supplier and the supplier must evaluate and release it before submitting the whole PPAP to VC. A change is only allowed after submission of new sample parts to VC (see 4.16. PPAP). For the new sampling it is only allowed to use approved subcontractors.

For a subcontractor change during serial production VC must be informed in advance (see 4.16. PPAP). The order to the subcontractor is only allowed after written agreement by VC. A delivery to VC is only allowed after full approval of PPAP by VC. In the case of a supplier change for safety critical purchased parts an intensified PPAP is mandatory.

4.17.15 Safety critical characteristic

Safety critical characteristics comprise in case of deviations a risk for life and limb.

Safety critical characteristics must be 100% insurable. Sampling inspections are not sufficient. For the safety critical characteristics which can be tested via destruction only, (e.g., the compression test for metal parts) one adequate sample control per load is sufficient. However, test method and sample rate must secure 100% conformity of critical characteristic. It must be ensured, that the purchase parts will be delivered via traceable batches without exceptions.

The quantity and frequency of testing defined in the control plan must be agreed with VC in separate process before PPAP submission. A member of the engineering as well as quality department of the supplier should participate in this agreement.

The supplier must assure customer specific requirements related to Safety Critical features are followed.

The fulfilment of the safety critical parts features must be documented completely (e.g., by a supplier certificate for each batch sent with the delivery). In case of no special agreement, the supplier must be able to send the documentation by request on the same day.

4.17.16 Investigation of field parts

In case the supplier delivers functional components or products (e.g., bearing, damper, electrical components . . .) to VC, the supplier must establish process for field part analysis, root cause investigation and continuous improvement. The process must follow related OEM and IATF requirements.

5. Functionaries / Touchpoints in VC

Activity / Task	GCM	Program Buyer	SQA TC / PQE	SQA Plant	SDE / STA
Contractual agreement of the VC Global Procedure	✓	✓			
Supplier APQP			✓		
PPAP Approval / Deviation Permit				✓	
ECR Request		✓			
Non-conforming parts / Supplier Quality Concerns				✓	
Supplier Escalation (coaching, development)					✓
Upload of Supplier Certificates, PPAP documentation package, 8D process	VC Communication Platform 'LIVESOURCE'				

6. APPENDIX / ENCLOSURE

No.	Type of Document	Title/Description	Enclosure
1	List	Definition of Special Characteristics	LI-01-7.3-0049
2	OPI	Early Production Containment	OPI-01-7.4-0015
3	List	Minimum requirements-M04 components with threads	LI-01-7.4-0082
4	List	Supplier Quality Cost Recovery Table	LI-01-7.4-0016
5	Form	Problem Solving Process Supplier	FO-01-8.5-0160
6	Form	Run@Rate suppliers (full audit)	FO-01-7.0-0103
7	Form	Permission-for-Deviation	FO-01-8.3-0002
8	Form	Supplier Process design review	FO-01-7.0-0217
9	Form	Supplier Process readiness	FO-01-7.0-0237
10	Form	EPC Form	FO-01-7.4-0149
11	Form	Shipment Marking Triangle	FO-01-7.4-0146
12	Form	Supplier Special Characteristics	FO-01-7.3-0216
13	Form	Supplier Change Request	FO-01-7.4-0300
14	Form	Sub-Supplier-Tree	FO-01-7.4-0335

7. FURTHER REFERENCE DOCUMENTS

7.1 Supporting documents

- General purchasing conditions of VC.
- Valid Scheduling Agreement with VC.
- GP-01-7.4-0009 "Logistics Requirements for Suppliers"
- General framework agreement

7.2 Supporting documents for compound suppliers only

- GP-01-7.4-0050 "Quality Manual Compound" (on Request)

7.3 Additional Information

- AIAG Manuals (latest version), PPAP, MSA, APQP, FMEA, SPC of the Big Three (GM, Ford, Chrysler).
- VDA-Manual 4.1: Assurance of Quality for Series Use
- VDA-Manual 4.2: System-FMEA
- VDA-Manual 1: Guidance on Records
- VDA-Manual 2: Assurance of quality for deliveries in the automotive industry.
- IATF 16949: Quality management systems. Special requirements in the application of ISO 9001:2000 for series and spare part production in the automotive industry

8. DOCUMENTATION

Vibracoustic will keep this procedure on file. In case of a revision the latest edition will be kept for at least 3 years after revision.