

SQM-H

Supplier Quality Management Handbook
MAHLE Behr - global

This Handbook is a summary of the processes and documents of
the supplier quality management

Scope of Application

The Supplier Quality Management Handbook applies to the business relationship between the supplier and MAHLE Behr, including the respective group companies, particularly to all existing and future supplies.

Access and Password for the Supplier Quality Management Handbook

MAHLE Behr employees can get to the Supplier Quality Management Handbook through MBMS.

Suppliers can get a copy of the Supplier Quality Management Handbook via the Purchasing page on the MAHLE Behr Internet page www.mahle.com.

Elaboration of terms

MAHLE Behr:	MAHLE Behr GmbH & Co. KG, Mauserstrasse 3, 70469 Stuttgart, as well as group companies of MAHLE Behr.
Group companies of MAHLE Behr	Existing or prospective national or international companies, from which MAHLE Behr holds directly or indirectly the majority of the shares or exercises the appropriate management control.
Customer:	Customer of MAHLE Behr, i.e. normally the automotive manufacturer.
Supplier:	Direct supplier of MAHLE Behr, with whom MAHLE Behr has a contractual arrangement in this regard.
Group companies of the Supplier:	Existing or prospective national or international companies from which the supplier holds directly or indirectly the majority of the shares or exercises the appropriate management control.
Supplier Quality Management Handbook:	The documents/files at the latest revision level requiring access details from MAHLE Behr purchasing, including any references to documents, available via www.mahle.com
Sub-supplier:	Supplier of the supplier.
Parts:	Products (individual parts, components, semi-finished product, etc.) that MAHLE Behr buys from his supplier.

Preamble

Requirements to the automotive industry

In the last years the requirements and expectations in the automotive industry have changed dramatically. The market competition became more aggressive concerning quality, costs and customer satisfaction. Today car manufacturers expect perfect quality from their suppliers. A low price is not seen as contradiction.

Quality goals and their meaning for the supplier and for MAHLE BEHR

After continuous decreases of quality targets for suppliers for many years MAHLE Behr has made the transition and specified the quality goal for its suppliers to zero ppm. The majority of our customers, the car manufacturers, give obligatory zero ppm quality targets to MAHLE Behr. The only way to ensure customer satisfaction is to pass down this target to the suppliers: it is not possible to supply the customer with zero ppm, if MAHLE Behr does not have absolutely error free supply by its suppliers.

Request of the quality processes

The existing supplier quality processes and documents are a summary and description of the requirements and expectations of MAHLE Behr to its suppliers. They are based on the requirements of the VDA and AIAG. They also contain a set of requirements, which are the "recognized practice" of the automotive industry.

The detailed descriptions and working instructions are provided to assist the MAHLE Behr employee and the supplier to implement and fulfill the requirements and expectations of these processes.

With these global valid processes a standardized practice will be possible for all MAHLE Behr locations as well as for our suppliers. This reflects the expectation of our customers and allows an effective support of the global purchasing and procurement activities.

Further regulations concerning Scope and Binding of the documents, Confidentiality and Validity as well as Archiving and Recommended Languages can be found in the detailed version of the Preamble.

Supplier Management and Development

Requirements for Suppliers Certification

In order to satisfy MAHLE Behr's quality expectations, each supplier is committed to implement a functional quality management system and perpetuate it. This must be documented with a certificate issued by an accredited certification company according to ISO/TS 16949:2002. Companies, which do not implement this standard correctly, cause unnecessary trouble and expenditures at their customers.

These certificates represent a judgment by a qualified third party that processes at the supplier run systematically and are controlled according to the latest industry requirements. The investigation of the implemented QM-System by an accredited body ensures an independent examination and comparability of audit results independent of MAHLE Behr personnel involvement.

Supplier Approval

The supplier approval process is intended to ensure that the customer and MAHLE Behr requirements are met regarding quality, purchasing, engineering, and logistics as well as ISO/TS requirements.

The supplier approval is valid for one supplier production location and for one material group (MG). However, it is valid for MAHLE Behr as well as group companies of MAHLE Behr, i.e. for all MAHLE Behr locations world wide. The approved suppliers are listed in the Global Supplier List (GSL).

In case of repetitive problems a supplier can be put "on hold" completely or for certain material groups (MG) only. Therefore, the supplier will not be considered for new business.

New Supplier Development

New suppliers who fail an initial MAHLE Behr evaluation due to significant deviations from requirements must be developed before MAHLE Behr approval will be given.

If there is a mutual interest in the supplier business relationship, this process description will apply for the following situations:

Completely new suppliers

Existing suppliers, proposing to supply from a new location

Existing suppliers, proposing to supply parts from a new material group (MG).

The supplier development process will be driven by the initial MAHLE Behr evaluation audit. The intent of the process is to qualify suppliers as being competent in certain areas and tasks.

Quality Tools of the Supplier

MAHLE Behr expects that suppliers are using appropriate quality tools that are standard in the industry and state of the art.

Compliance to the ISO/TS 16949:2002 requirements must be guaranteed by the supplier's management system. MAHLE Behr puts a special emphasis on the following quality tools and methods which must be implemented:

- Recording and working with quality and delivery score
- Management of the sub suppliers
- Lessons learned
- Continuous improvement process

Strategic Supplier Evaluation

Annually MAHLE Behr conducts a Strategic Supplier Evaluation; in which the departments of Purchasing, Supplier Quality of the Production Location (SQP), Engineering and Logistics evaluate the supplier in equal shares. The evaluation takes place at each MAHLE Behr location to which the supplier ships (Local Supplier Evaluation). If the supplier ships product to several MAHLE Behr locations, the "Local Supplier Evaluations" are merged into a "Global Supplier Evaluation".

Depending on the evaluation of the questionnaire, 3 different levels can be achieved:

- Green = acceptable
- Yellow = marginal
- Red = unacceptable

Based on the results of the supplier evaluation a horizontal cross functional team can block a supplier with consistently poor results, or decide to terminate all contracts with that particular supplier.

Responsibilities Concerning Supplier Quality Tasks

A clear definition of responsibility and cooperation for the different supplier quality tasks improves processing. The processes at MAHLE Behr are more efficient and provide a smooth workflow.

The table "responsibility, participation and information in supplier quality tasks" illustrates to all MAHLE Behr employees the responsibilities concerning supplier quality tasks.

Preventive Quality Activities (APQP)

Specification of Submission Level for Advanced Product Quality Planning (APQP) and Production Part Approval Process (PPAP)

The advanced product quality planning (APQP) and the production part approval process (PPAP or PPF) for purchased parts are an important part of the MAHLE Behr supplier quality management. They are useful for the preventive quality work in the industrialization phase and for a smooth start of production.

The submission level defines extent and manner of the activities within the advanced product quality planning (APQP) and the production part approval process (PPAP or PPF). Specification of the submission level takes place prior to the time when the request for quotation is sent to the supplier. The suppliers' offer should consider these requirements.

This facilitates a timely definition and planning of all necessary activities and documents for purchased parts and its implementation.

Contract Review Meeting

Due to today's short development times it is essential that we initiate and maintain good communication and project planning between MAHLE Behr and the supplier. This task is commenced by the contract review meeting.

During the contract review meeting, the Advanced Product Quality Planning (APQP) and the Product and Process Approval Process (PPF or PPAP) must be documented and agreed to between MAHLE Behr and the supplier. The contract review meeting is the major communication tool between MAHLE Behr and the supplier for coordinating the development and industrialization phases. All departments involved at the supplier and at MAHLE Behr are obligated to participate in this meeting. The contract review meeting takes place before the contract awarding in order to close out all open points and to clarify legally binding issues before the awarding of the written contract.

Definition of Quality Targets for New Parts

The target of zero defects reflects the quality understanding of the supplier and MAHLE Behr. For procurement of new parts, supplier changes, resourcing and transfers, this target will be passed on to the suppliers. The supplier must commit to meet the zero defect target, by utilizing an appropriate control plan and quality measures. Claims from MAHLE Behr, especially concerning warranty remain unaffected by this. The supplier makes sure, that this commitment is achievable by the formulation of an appropriated control plan.

Control Plan

A control plan is summarizing all inspections performed on the part or in the process during the part production. The control plan corresponds to the equivalent document of VDA and ISO/TS 16949:2002 and the "Control Plan" described in AIAG, APQP. In order to improve reading and understanding of the processes the layout of the control plan should follow the flow of the production process.

Product and Process Validation / Initial Sampling (PPAP)

Internal Process Audit

Audits are an accepted quality tool in the automotive industry. They help the supplier to validate and to improve its processes. The purpose of the internal process audit is for the supplier to check its processes in case of new processes, periodic requalification, and customer complaint.

The audit results are to be documented and in the event of a finding, a corrective action plan must be provided.

Production Process Audit

The MAHLE Behr production process approval is a part of the approval process according to PPAP or PPF and is done through a process audit. Based on this audit the readiness of the processes for series production is determined or product or process changes are approved. The MAHLE Behr Production process approval is conducted after the supplier successfully conducts an internal process audit. Any kind of process may be the subject of a MAHLE Behr production process audit (i.e. incoming goods inspection, production, shipping, test processes, engineering, and administration).

The task of the MAHLE Behr production process audit is to determine the process maturity. MAHLE Behr production process audit is not to point out elementary or trivial deviations or to effect remedial actions; this is the responsibility of the supplier.

Capacity Evaluation for Purchased Parts

The capacity evaluation is a performance test to verify the production capacity under series production conditions. For this purpose, the production equipment is evaluated during a stable production run (no deviations or breakdowns are permitted). Nevertheless, the capacity evaluation can also be used to evaluate other departments (such as warehouse, logistics, quality, etc.). The capacity evaluation includes the documenting of the quantity of defective products including rework. It is usually used for parts requiring specific tooling or machines. The capacity evaluation can be combined with the production process audit.

Production of Initial Samples

Initial samples are parts which are manufactured and examined under series conditions. Initial samples are used to determine whether the production process is ready to begin serial production.

This process describes standardized conditions for successful production of initial samples. Initial samples may only be taken from an approved manufacturing process. Initial samples must be obtained and documented as per requirements.

Initial Sample Report and Presentation

Initial Sample Presentation is the basis for the product and the process approval. The presentation of the initial samples shows the feasibility of the parts and the readiness of the supplier for the serial production. This process defines the different steps for the presentation of the Initial Sample Report (ISR). This includes guidelines for form and content of the ISR, as well as for packaging and transmission of the initial sample (IS) and the ISR. The initial sample report (ISR) must be complete and in compliance with the requirements.

Along with the Process Audit, the ISR is the decision basis for serial production approval of MAHLE Behr.

Processing of Initial Sample Presentation at MAHLE Behr

Purchased parts must be of high quality in order to guarantee MAHLE Behr product quality.

Evaluation and approval of initial samples and an initial sample report comprise the final part of PPAP or PPF. The approval of the supplier's initial samples report and processes includes the release for the serial production. This procedure describes the processing of the initial samples report at MAHLE Behr.

Defective Material Management

Goods receipt

Only via an approved initial sample report or deviation permit approved parts are allowed to be shipped to the MAHLE Behr goods receipt for serial production.

The necessary inspection for the quality of the part takes place at the supplier. The supplier has the full responsibility for perfect delivered quality and assures the correct execution of the specified inspections and testing.

Defective Delivered Material

Defective material must be handled in such a way as to minimize negative effects from these parts on MAHLE Behr production. The main focus is to avoid production disruption, bottlenecks, additional testing or other expenditure due to defective deliveries.

The regulations covering this apply unless other regulations have been agreed on as a part of a Quality Assurance Agreement (QAA) or Supplier Management Agreement (SMA).

Costs which result from defective purchased parts or raw material will be debited to the supplier.

Eight Discipline Problem Solving Process (8-D Report)

The 8-Discipline problem solving form (8-D Report) is a standardized tool, used to eliminate the cause of the non-conformance in order to prevent recurrence effectively. In the event of non-conforming purchased parts, the supplier uses the 8-D Report to submit all necessary information to MAHLE Behr.

Consistency of Error Management

When quality issues occur on supplied products, it is vital not only to identify and correct the root cause of the issue, but also to prevent a similar error from occurring in similar processes, or on similar products, both at the supplier itself and at other suppliers.

Care should be taken to specifically avoid the following problems:

- Repetition of the same error
- Occurrence of the errors of similar parts or processes
- Occurrence of already recognized errors at other suppliers
- Errors found at a MAHLE Behr location which also appear at other MAHLE Behr locations utilizing the same purchased parts or the same processes

Follow-up Process Audit

Follow-up process audits serve to maintain and to rebuild a stable and capable process at the supplier. Process audits are done in the event of quality risks in a process, in an effort to find these risks, as well as after complaints to control implementation and effectiveness of the corrective actions. This should prevent repetitive errors and assure the delivery of good parts.

The supplier has, in principle, the full responsibility for its processes. Therefore, an internal process audit should always precede a follow-up process audit by MAHLE Behr. The task of the MAHLE Behr follow-up process audit is to assess the qualification of the process. It is not to point out elementary or trivial deviations or to affect resolution activities. This lies completely as the responsibility of the supplier.

Escalation Measures for Quality Problems

This process specifies the escalation rules in the event of severe or recurring quality problems and/or of increased supplier risk. With this process further damage and risks should be avoided for MAHLE Behr and its customers. The supplier is obligated to independent examinations and a daily reporting. In this phase the supplier is monitored closely by MAHLE Behr supplier quality. A return to a normal manufacture process is only possible after proof of effectiveness of the corrective actions and a qualifying cooling period of 20 working days.

Deviation Permit for Purchased Parts

A deviation permit is necessary, if parts with deviations to the approved product or process are to be used. This can occur at the IS presentation or during the serial production and supply. Temporary production shifts or process modification are also considered as a deviation. Deviations are also changes of a product after final control (rework), which were not released at the IS presentation.

If a product function could affect the customer', a customer deviation permit is mandatory before a MAHLE Behr deviation permit can be issued to the supplier.

Deviation permits are limited in time. Therefore the deviations have to be eliminated during validation period of the deviation permit. A deviation permit can be extended twice. If a deviation is permanent, this needs to go through initial sample presentation.

In case of deviations, no product shipment to a MAHLE Behr location is allowed without an approved deviation permit from MAHLE Behr.

Field Claims Technical Analysis

Customer complaints due to failures in the field are diagnosed by MAHLE Behr, i.e. analyzed as to the technical cause of failure. In the case of field failures caused by defective purchased parts, the supplier is included in the diagnostic process (technical analysis).

The results of the technical analysis determine a "Technical Factor" on the customer side, and also, if necessary, on the side of the supplier. The technical factor forms the basis for accurate and pro rata handling of complaint cases from the field. This occurs according to the regulation of the agreement of technical factors for field claims in accordance with the latest version of the procedure, which is made available to the supplier upon request e.g. in relation to a specific field claim.

Cost Recovery from Supplier

Costs incurred by the end customer or by MAHLE Behr due to defective purchased parts are debited to the supplier. After technical analysis, the incurred costs are distributed in a pro rata manner.

This applies to defects found by MAHLE Behr (ex. in the goods receipt or in production), as well as to zero-mileage defects and field failures discovered by the customer. In each case, the costs incurred by MAHLE Behr as well as applicable customer recovery claims towards MAHLE Behr are debited to the supplier. In the case of field failures, a technical factor, which determines the cost distribution, is stipulated.

The supplier is informed by means of the inspection report and the debit note.

Supplier Management in Serial Production

Supplier Delivery Quality Score

Key-measures serve the supplier quality and purchasing departments with the capability to monitor and control the delivered quality. The delivery and quality score demonstrate delivery achievement to the supplier.

At MAHLE Behr the same calculation is used for the determination of the quality score, in order to ensure comparability over all purchased parts and suppliers. The suppliers' delivery quality score is made available to the supplier. The delivery quality score helps the supplier quality department to initiate corrective action plans at the suppliers and to observe its effectiveness.

Definition of Quality Targets for Serial Parts

The target of zero defects reflects the quality understanding of the supplier and MAHLE Behr. For procurement of new parts, this target will be passed on to the suppliers. The supplier must commit to meet the zero defect target in serial production.

In case of non achievement of the target, a corrective action plan will be defined with the supplier, in order to bring him back to the target.

Development Program for Serial Production Suppliers

MAHLE Behr arranges a special development program for serial production suppliers not adhering to the quality targets, due to substantial and serious quality problems.

The development program takes one year. Its aim is to support the supplier in focusing consistently, its organization to quality and customer satisfaction and to achieve perfect serial production quality, by implementing a systematic and effective improvement program.

Approval Requirements for Changes

This is the procedure for product and process changes in serial production. This procedure is to assure that product and process changes at the supplier will be approved, if necessary, by MAHLE Behr before they are implemented. The classification of the proceeding takes place in two levels:

Product or process changes according to the criteria below always requires an initial sampling to MAHLE Behr.

For other changes, information must be submitted to MAHLE Behr. Then MAHLE Behr decides if an initial sampling is necessary.

In case of doubt, MAHLE Behr must be informed of the intended product or process change in time or the higher level must be used.

Periodic Product Requalification

With the periodic product requalification the supplier is proving that the parts and the processes in current serial production are fulfilling the requirements of the drawing and specifications. The supplier is responsible for the implementation. Frequency and content of the requalification is agreed upon between MAHLE Behr and the supplier and documented in the production control plan.

Part History Sheet

The part history sheet is used to document all events or changes, such as drawing changes, changes of process parameters or production location, in order to reflect the history of the part and its production process. The supplier is responsible to maintain the document and make it available to MAHLE Behr on request.