

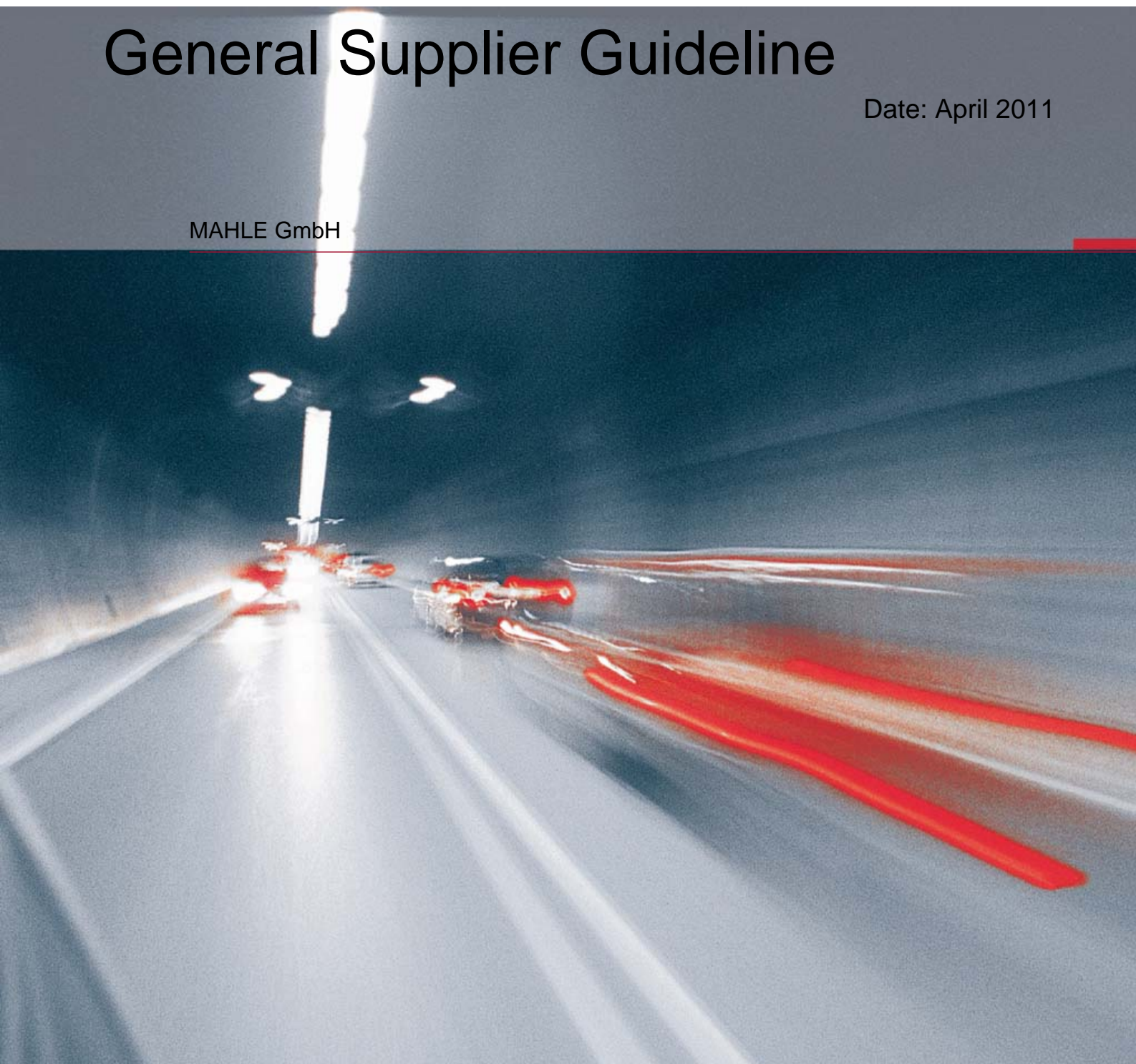
**MAHLE**

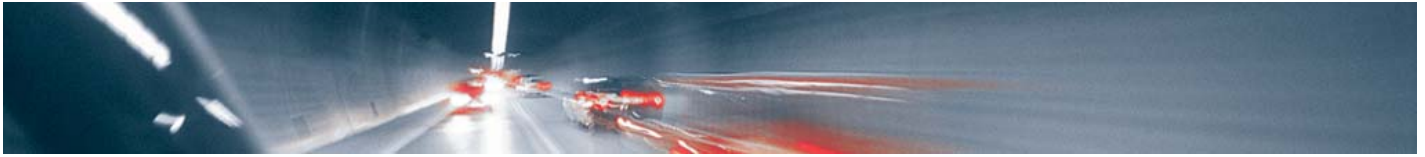
*Driven by performance*

# General Supplier Guideline

Date: April 2011

MAHLE GmbH

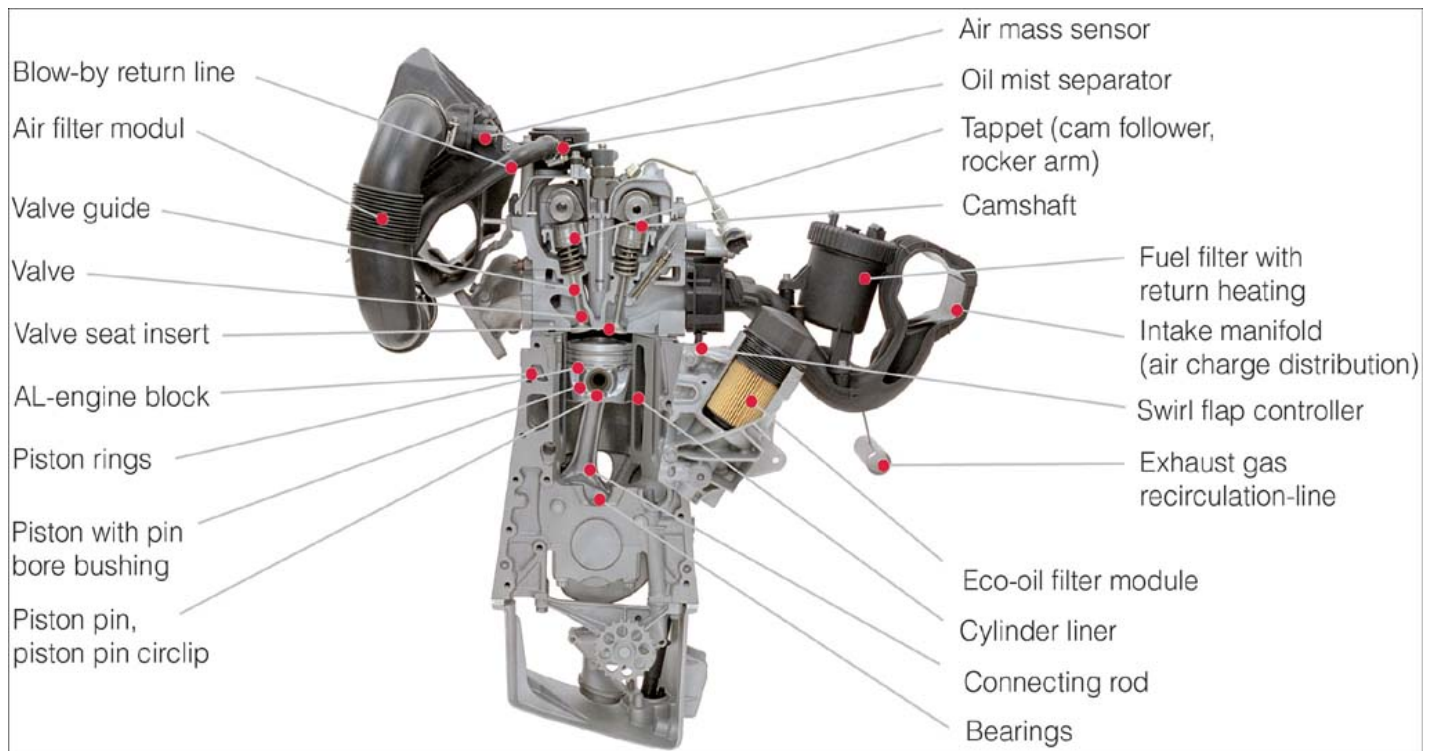




## Introduction

The MAHLE Group is a leading global manufacturer of components and systems for the combustion engine and its peripherals – from piston systems, cylinder components, valve train systems to air management and liquid management systems. With around 47,000 employees at over 100 production plants and 8 research & development centers, MAHLE anticipates sales of almost EUR 5,3 billion in 2010, positioning the company among the top 30 largest automotive suppliers worldwide.

We are among the leading suppliers in the world market in all product segments and are a valued development partner and important systems suppliers among all automobile and engine manufacturers.



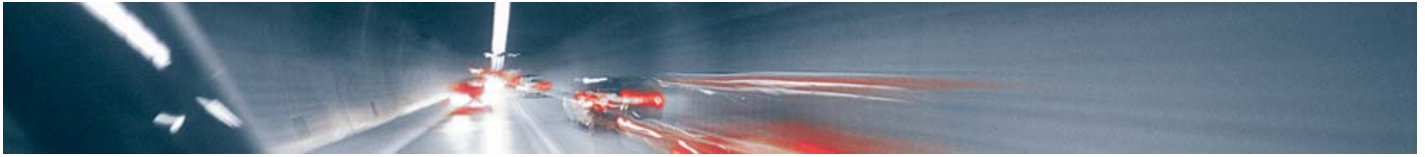
Worldwide competition, changing customer expectations and product requirements necessitate the continuous improvement of all products, processes and corporate procedures.

The quality and position of our products in the world market are also directly affected by the quality of our suppliers' products. Increasing customer requirements and highly dynamic global markets require a high degree of responsiveness, flexibility and global orientation from us and our suppliers. The continuous improvement of products and processes as well as the sustained preservation of quality and costs affect the entire procurement network, in which you as a supplier play an important role.

These guidelines are intended to outline the expectations, requirements, prerequisites, methods as well as implementation examples necessary to achieve our common objectives. These guidelines are binding for all products and services provided by a supplier to MAHLE.

Thomas Maurer  
Director, Corporate Purchasing Europe

Günther Fritz  
Manager Supplier Management, Corporate Purchasing Europe



## Requirements and Benefits

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Our requirements placed on you as a MAHLE supplier or a provider interested in future collaboration, as outlined below, are an important pillar for an efficient and successful business relationship. Your fundamental willingness to accept the obligations is a prerequisite for our mutual business relations.

From you, as a supplier, we expect a high commitment to performance and the dedication to accept these requirements and implement them.

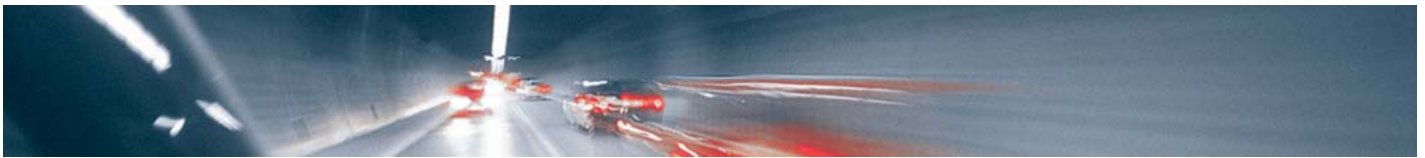
- Assuring consistent, high product and process quality
- 100% fulfillment of MAHLE's expectations and those of our customers
- 100% delivery performance
- Competitive quotations on a global market level (total cost of ownership)
- Continuous productivity improvement and annual cost reductions
- Effective and prompt communication
- Products based on state-of-the-art technology
- Acceptance of systems development responsibility

We look to you as creative and innovative partners on the procurement market, who support us with your experience in the expansion of our technological leadership position. The benefits are as follows:

- Easier access as a qualified MAHLE supplier to additional business segments
- Participation in the innovation and creativity potential of the MAHLE Group
- Potential sales growth and market share growth
- Integration in international development projects and access to new markets
- MAHLE as a reference in your customer list

The materials and products we procure from our suppliers have a crucial influence on the quality of our products. The extremely high requirements in the automotive industry challenge us and our suppliers to excellence every day.

We accept this challenge.



## Overview of the Main Steps of the MAHLE Supplier Management System



During the supplier selection process, potential suppliers stand out by meeting our requirements for specifications, innovation, quality and cost. Partnership and trust form the basis of our collaboration with suppliers.

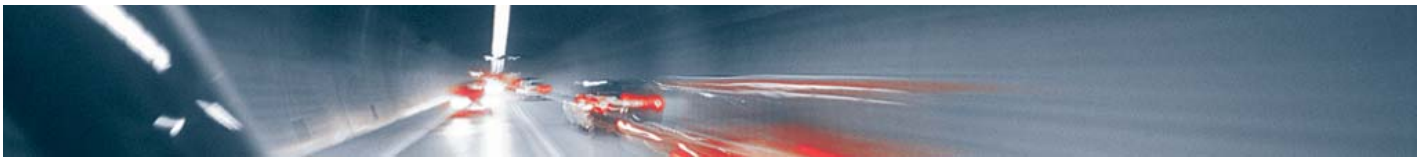
After being nominated, our suppliers assume responsibility to achieve the challenging objectives. Crucial requirements include the production and delivery capability as well as the fulfillment of our quality expectations, starting on the first day of production all the way to the end of the product life cycle.

A large portion of the purchased parts and the corresponding production processes are developed by our suppliers. This underlines the importance and our high demands on the development and procurement partners worldwide when it comes to the design of MAHLE products.

Throughout the product and process development and series production stages, all conceivable risks must be identified and minimized as early as possible. During this risk assessment process, our direct suppliers must assume responsibility for the entire supply chain of the ordered parts, starting at the interface with the MAHLE Group to your own suppliers and beyond.

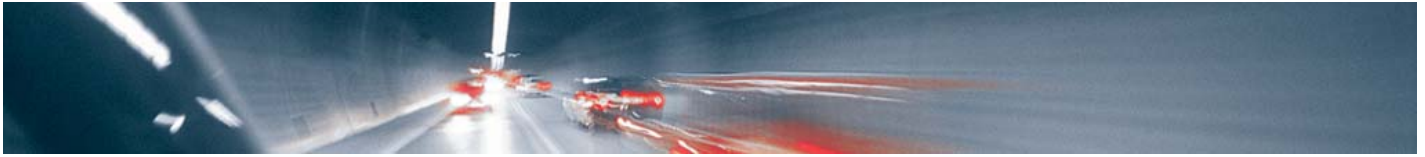
Within the scope of the approval process and prior to the commencement of series production, our suppliers must demonstrate their ability to manufacture and supply production parts that meet all relevant requirements, using stable production and delivery processes and production tools and processes, at the agreed cost. The responsibility for performing all necessary steps lies with the supplier.

In the event that problems occur during the product, and process development or series delivery, they must be clearly identified and resolved as effectively as possible. A defined escalation process serves the efficient use of resources in the problem-solving process. The problem shall be addressed based on open communication, trust and a functioning partnership. The problem-solving process shall be the responsibility of the supplier, while integrating the involved areas of the MAHLE Group.



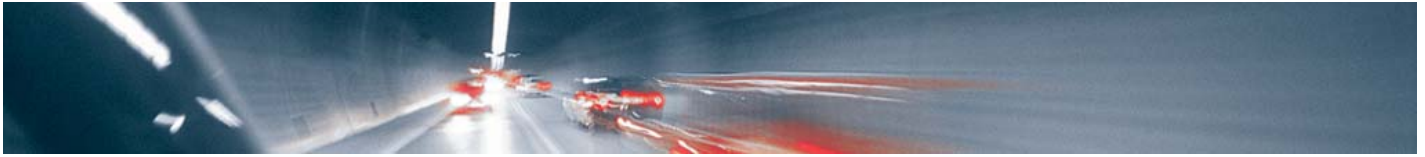
## General MAHLE Supplier Requirements

Criterion	Requirements placed on the supplier by MAHLE	Implementation and verification
<b>Experience in the automotive / automotive supply industry</b>	Existing collaboration with automobile manufacturers / automotive suppliers. Familiarity with and use of distinct specifications and methods relating to the automotive industry.	<ul style="list-style-type: none"> <li>■ List of references</li> </ul>
<b>Global presence</b>	Global orientation to support MAHLE as a worldwide manufacturer, world market orientation and the ability to supply all international MAHLE locations.	<ul style="list-style-type: none"> <li>■ International support as key account</li> <li>■ Production plants on all continents/in all countries, including Leading Competition Countries</li> </ul>
<b>Quality and environmental management system</b>	Effective implementation of a quality and environmental management system. Minimum requirement is a valid certification according to DIN ISO 9001:2000. Compliance with automotive standards on the basis of ISO TS 16949:2002. Certification according to ISO/TS 16949:2002 must be planned and implemented. Compliance with DIN EN ISO 14001.	<ul style="list-style-type: none"> <li>■ Valid certificate based on DIN ISO 9001:2000 (minimum) or ISO TS 16949: 2002</li> <li>■ Implementation of DIN EN ISO 14001</li> </ul>
<b>Preventive methods for failure detection and prevention</b>	Failure prevention before failure detection. Obligation to follow the "zero error principle". Product and performance responsibility throughout the entire process chain, from the development to the end customer.	<ul style="list-style-type: none"> <li>■ Quality control systems</li> <li>■ Continuous improvement projects</li> <li>■ Data analyses</li> <li>■ Early warning systems</li> <li>■ Poka Yoke</li> </ul>
<b>Procurement and supplier management</b>	Systematic selection and evaluation of sub-contractors. Assignment of the MAHLE requirements to your sub-contractors. Implementation of qualification activities at/with sub-contractors. Procurement only from certified sub-contractors. Minimum requirement placed on your sub-contractors is a valid certificate according to DIN ISO 9001:2000.	<ul style="list-style-type: none"> <li>■ Sub-contractor selection, development, optimization and evaluation system</li> <li>■ Scheduling and procurement from released and certified sub-contractors</li> <li>■ Valid certificates</li> <li>■ Advance product quality planning at sub-contractors (APQP according to QS9000)</li> </ul>
<b>Contractual partnership</b>	Acceptance of the general supply contract, tooling supply contracts, confidentiality agreements, quality assurance agreements, special logistics agreements, consignment contracts, general conditions of purchase, willingness to reduce the incoming inspection at MAHLE.	<ul style="list-style-type: none"> <li>■ Conclusion of the contract</li> </ul>



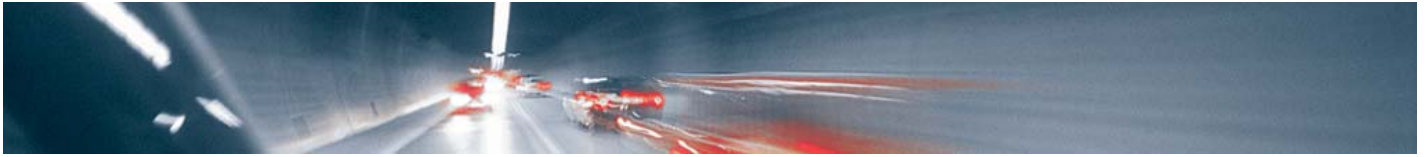
## General MAHLE Supplier Requirements

Criterion	Requirements placed on the supplier by MAHLE	Implementation and verification
<b>Cost structures</b>	Transparency and disclosure of the cost structures and pricing throughout the entire process chain. Determination of target prices and optimization of cost structures. Detailed breakdown of the prices of parts and tool cost..	<ul style="list-style-type: none"> <li>■ Transparent calculation</li> <li>■ Target costing</li> </ul>
<b>Cost reduction potentials</b>	Implementation of cost reduction projects. Utilization of product potentials. Supplier cost reduction suggestion program.	<ul style="list-style-type: none"> <li>■ Value engineering projects together with MAHLE and with the sub-contractors.</li> </ul>
<b>Continuous improvement</b>	Continuous improvement process for cost optimization and annual productivity increases. High competitiveness at a world market level with respect to price, quality, faithfulness to deadlines and flexibility.	<ul style="list-style-type: none"> <li>■ KVP organization</li> <li>■ KVP projects</li> <li>■ Supplier suggestion program</li> </ul>
<b>Communication and data exchange</b>	Close collaboration in the development phase. Compatibility with respect to data exchange. Processing of native data and EDI/web EDI. Willingness to actively collaborate in innovative development projects. Protection of the confidentiality of transmitted information.	<ul style="list-style-type: none"> <li>■ Resident Engineer for joint development projects</li> <li>■ IT-supported exchange of information (e.g. remote data transmission/EDI)</li> <li>■ Processing of native CAD data (among others, CATIA V4, CATIA V5, ProEngineer 2001 etc.)</li> <li>■ Processing of standard VDA formats (e.g. 4905, 4915)</li> </ul>
<b>Project implementation</b>	Availability of appropriate resources/contact persons to meet MAHLE's expectations. Set-up and implementation of a project management system.	<ul style="list-style-type: none"> <li>■ Project organization</li> <li>■ Milestone planning</li> <li>■ Quality Gates</li> </ul>
<b>Payment terms</b>	Acceptance of standard MAHLE payment terms. Acceptance of MAHLE's Conditions of Purchase.	<ul style="list-style-type: none"> <li>■ Agreement on automotive-specific payment terms and conditions</li> </ul>
<b>Handling of payments</b>	All customary payment methods. Willingness to settle deliveries/services through credit notes	<ul style="list-style-type: none"> <li>■ Credit note method according to VDA</li> </ul>



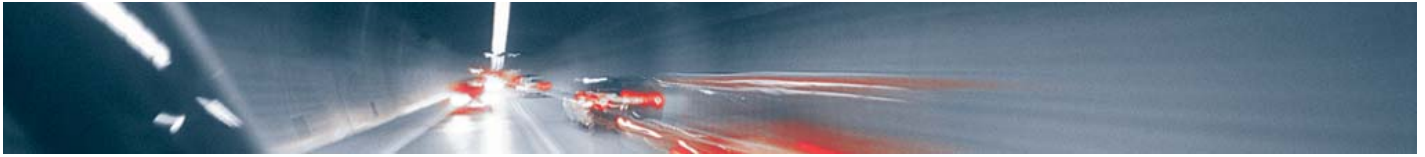
## General MAHLE Supplier Requirements

Criterion	Requirements placed on the supplier by MAHLE	Implementation and verification
<b>E-Business activities</b>	Participation in auctions and online bidding	
<b>Provisions and insurance</b>	Insurance coverage for damages due to plant failures, property insurance for company capital goods, product liability and product recall insurance.	<ul style="list-style-type: none"> <li>■ Business and product liability insurance</li> <li>■ Recall cost insurance</li> <li>■ Back-up plan for production disruptions</li> </ul>
<b>Change management</b>	Complete information about planned changes to products and processes (including by your sub-contractors). Compliance with the specifications for initial sampling and special identification. Documentation and traceability of all changes.	<ul style="list-style-type: none"> <li>■ Timely written notice of planned changes.</li> <li>■ Changes must be approved by MAHLE.</li> <li>■ EinCompliance with VDA Volume 2 (PPF), QS9000 (PPAP)</li> <li>■ Product and process life cycle.</li> </ul>



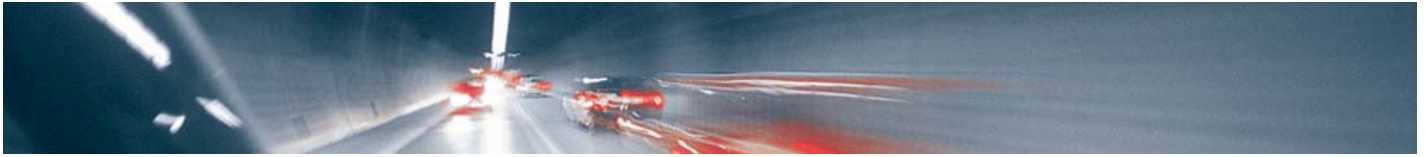
## Product and Process Life Cycle

Criterion	Requirements placed on the supplier by MAHLE	Methods and verification
<b>Development planning</b>	Definition of the development objectives, development planning, development testing and evaluation, development release.	<ul style="list-style-type: none"> <li>■ Development objectives</li> <li>■ Development plan</li> <li>■ Specification</li> <li>■ Specificatin sheet</li> <li>■ Product data</li> <li>■ Testing and evaluations</li> </ul>
<b>Feasibility studies</b>	Technical and scientific know-how. Definition of significant and critical characteristics. Creation of specifications and product data. Development testing. Ability to produce prototypes. Review of feasibility with respect to function and producibility.	<ul style="list-style-type: none"> <li>■ Product data</li> <li>■ Tests</li> <li>■ Simulations</li> <li>■ Lab tests</li> <li>■ Prototypes</li> <li>■ Development evaluations</li> </ul>
<b>Advance quality planning</b>	Ability to implement automotive standards. Incorporation and application of failure-prevention methods and processes aimed at preventive quality assurance.	<ul style="list-style-type: none"> <li>■ Quality planning baed on QS9000 (APQP) or VDA Volume 4.</li> </ul>
<b>Manufacturing concept</b>	The supplier must design a concept, which ensures that the supplier is able to meet MAHLE's planned requirements during series production with respect to quantity and quality.	<ul style="list-style-type: none"> <li>■ Process organization plan, including process steps and testing</li> <li>■ Process layout</li> <li>■ Capacity planning for pre-series and series production</li> <li>■ Emergency management</li> </ul>
<b>Risk analyses</b>	Estimation of quality risks. Preventive use of systems FMEAs at product and process levels for the timely detection and prevention of defects. Definition and evaluation of significant and critical features.	<ul style="list-style-type: none"> <li>■ Systems FMEA - product</li> <li>■ System-FMEA - process</li> <li>■ Systems FMEA - logistics</li> <li>■ Significant and critical characteristics</li> </ul>
<b>Statistical processes</b>	Determination of required statistical processes for all stages of product implementation and within the scope of product and process development. Use of statistical processes and methods.	<ul style="list-style-type: none"> <li>■ Test planning</li> <li>■ Simulations</li> <li>■ Capability analyses</li> <li>■ Statistical process control</li> <li>■ Quality control charts</li> </ul>



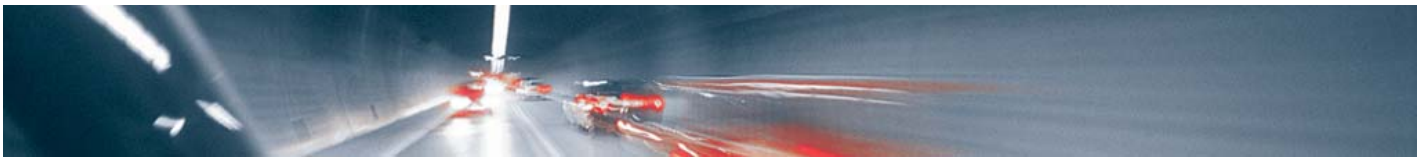
## Product and Process Life Cycle

Criterion	Requirements placed on the supplier by MAHLE	Methods and verification
<b>Test planning</b>	Ability to compile the test specifications based on automotive standards as well as to perform test method capability analyses.	<ul style="list-style-type: none"> <li>■ Control plans for prototypes, pre-series and series</li> <li>■ Inspection plans and instructions</li> <li>■ Capable inspection procedures</li> </ul>
<b>Capability studies</b>	Determination and evaluation of short-term and machine capability process quality characteristics as well as long-term process capability characteristics of the manufacturing processes. Adherence to the required capabilities for production and testing equipment.	<ul style="list-style-type: none"> <li>■ Cm, Cmk <math>\geq</math> 1.67</li> <li>■ Pk, Ppk <math>\geq</math> 1.67</li> <li>■ Cg, Cgk <math>\geq</math> 1.33</li> </ul>
<b>Product and process approval</b>	Sampling management according to automotive standards. Data maintenance in the International Material Data System (IMDS). Production process approval. Internal process approval and approval of the series production / testing equipment and tools. For the series production approval, the supplier must carry out manufacturing tests under production conditions. This is carried out within the scope of the pre-series, during which a defined quantity must be produced under production conditions.	<ul style="list-style-type: none"> <li>■ Execution according to QS9000 (PPAP) or VDA Volume 2 (PPF)</li> <li>■ Process series approval by MAHLE, including performance test (Rub@Rate)</li> <li>■ Internal tool approval</li> <li>■ Results of the manufacturing tests</li> <li>■ Internal process approval</li> <li>■ Maintenance and repair instructions</li> <li>■ Production tools and equipment ready-for-production</li> <li>■ Staff qualification</li> <li>■ Introduction / training at the workplace</li> <li>■ Working / testing instructions</li> <li>■ Workplace / testing site layout</li> </ul>



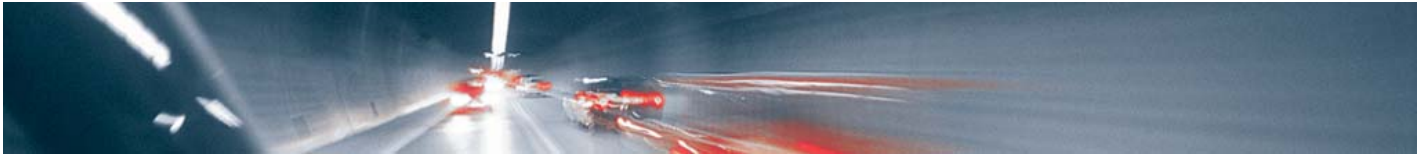
## Volume Production Deliveries

Criterion	Requirements placed on the supplier by MAHLE	Implementation and verification
<b>Production planning and control</b>	Translation of the MAHLE requirements into production orders, capacity planning, order control. Provision of suitable and capable production tools to safeguard controlled production. Provision of all necessary instructions. Compensation for fluctuations in requirements of up to 4 weeks prior to delivery date $\pm 10\%$ of the agreed-upon delivery volume and starting 4 weeks prior to the delivery date $\pm 30\%$ of the agreed-upon delivery volume.	<ul style="list-style-type: none"> <li>■ Capable manufacturing processes</li> <li>■ Further processing of the supply orders without systems breakdowns</li> <li>■ Application of PPS/ERP systems</li> </ul>
<b>In-process quality assurance steps</b>	Planning and implementation of product and process testing.	<ul style="list-style-type: none"> <li>■ In-process testing</li> <li>■ Statistical Process Control (SPC)</li> <li>■ Documentation of test results</li> <li>■ First-piece/last-piece testing</li> <li>■ Control of defective units</li> </ul>
<b>Management of defects</b>	Assurance that no defective units are forwarded. Identification and control systems.	<ul style="list-style-type: none"> <li>■ Organizational regulations, provisions</li> <li>■ Accompanying documents for identification.</li> <li>■ Failure analyses</li> </ul>
<b>Testing equipment management</b>	Assuring capable inspection procedures. Periodic calibration of testing and measuring equipment used. Gauge monitoring.	<ul style="list-style-type: none"> <li>■ Testing equipment monitoring system</li> <li>■ Calibration verification</li> <li>■ Accredited external service providers</li> <li>■ Measurement systems capability evaluations based on QS9000 (MSA) or VDA Volume 5</li> <li>■ Qualified testing staff</li> </ul>
<b>Traceability</b>	Assurance of complete and comprehensive traceability of all products from the end user to your sub-contractors.	<ul style="list-style-type: none"> <li>■ Batch documentation</li> <li>■ Batch separation</li> <li>■ Product and container identification</li> <li>■ Compliance with FiFo principle</li> <li>■ Shipping documents</li> </ul>
<b>Process capability</b>	Regular process capability analyses and evaluations. Observation of significant and critical characteristics. Adherence to the required capabilities. Response plans for out-of-spec processes.	<ul style="list-style-type: none"> <li>■ <math>C_p, C_{pk} \geq 1.33</math></li> </ul>
<b>Requalification</b>	Planning and execution of periodic requalification inspections.	<ul style="list-style-type: none"> <li>■ Periodic, comprehensive dimensional, functional and material cross-checks</li> </ul>






## Volume Production Deliveries

Criterion	Requirements placed on the supplier by MAHLE	Implementation and verification
<b>Qualified employees</b>	Informed and qualified staff. Prompt implementation of qualification activities on the basis of a systematically determined qualification need. Training in the workplace. Promotion and determination of quality awareness.	<ul style="list-style-type: none"> <li>■ Qualification planning and verification</li> <li>■ Verification of introduction and training</li> <li>■ Workplace audits</li> <li>■ Stand-in provisions</li> <li>■ Qualification verification</li> </ul>
<b>Logistic</b>	<p>Acceptance and implementation of innovative delivery concepts</p> <p>Correct and conforming handling, storage and transport. Adherence to delivery date and quantity targets. On-going inspection and realignment of logistics processes and their continuous improvement with the participation of your sub-contractors. Compliance with MAHLE shipping and packaging instructions. Adherence to the identification instructions. Observation of the manufacturing dates and expiration dates. Qualified transport services providers.</p>	<ul style="list-style-type: none"> <li>■ Consignment warehouse</li> <li>■ JIT</li> <li>■ Kanban</li> <li>■ Adherence to storage and transport instructions</li> <li>■ 100% compliance with delivery and quantity terms</li> <li>■ Application of FiFo principle</li> <li>■ Selection of packaging based on qualitative, economical and ecological aspects.</li> <li>■ Labeling according to VDA standard</li> </ul>
<b>Test certificates</b>	Guarantee of batch traceability. Assurance of compliance with required material specifications and required delivery quality.	<ul style="list-style-type: none"> <li>■ Acceptance certificate according to DIN EN 10204 for commodities and materials</li> </ul>
<b>Emergency management</b>	Protection processes or emergency concepts for installations, equipment, safety buffers and EDP. 100% guarantee of MAHLE supply.	<ul style="list-style-type: none"> <li>■ Contingency plan</li> <li>■ Hotline</li> <li>■ Contact persons</li> <li>■ Service and maintenance agreements</li> <li>■ Flow charts listing responsible parties</li> </ul>
<b>Documents and records</b>	Regulating the control and archiving of specification and verification documents (record).	<ul style="list-style-type: none"> <li>■ Control matrix for documents and records</li> <li>■ Retention: minimum of 15 years</li> <li>■ Observation of VDA Volume 1</li> </ul>
<b>Complaint management</b>	Systematic implementation of corrective action and preventive measures in the team. Avoidance of repeat errors. Use of problem-solving methods.	<ul style="list-style-type: none"> <li>■ 8D processes</li> <li>■ Pareto analyses</li> <li>■ Ask why</li> <li>■ Cause-and-effect diagram</li> </ul>



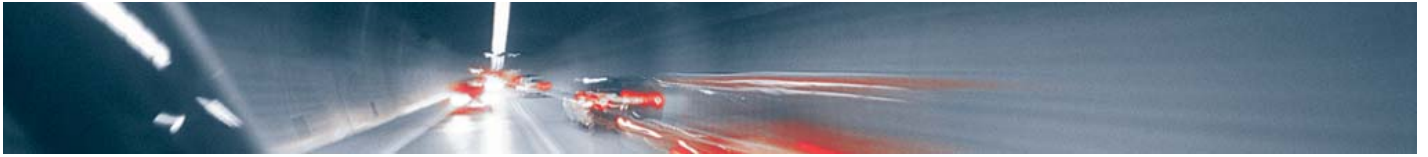
## Problem Solving Path and Escalation Processes

Escalation level		Cause	Action
	<b>Level 1</b>	Product and service quality do comply with the agreements and requirements	None
	<b>Level 2</b>	Product and service quality do <b>not</b> comply with the agreements and requirements <ul style="list-style-type: none"> <li>■ Product complaints</li> <li>■ Faithfulness to quantities and deadlines unsatisfactory.</li> <li>■ Insufficient reaction to complaints</li> </ul>	<ul style="list-style-type: none"> <li>■ Problem-solving discussion with supplier to clarify and define further action</li> <li>■ Initiation and implementation of measures on-site at supplier's facility (audit, logistics process analysis, risk assessment, etc...)</li> </ul>
	<b>Level 3</b>	Product and service quality do <b>not</b> comply with the agreements and requirements <ul style="list-style-type: none"> <li>■ Severe deviations and complaints</li> <li>■ Repeat product complaints</li> <li>■ Line shut-down</li> <li>■ Insufficient ability and/or willingness to solve the problem</li> </ul>	<ul style="list-style-type: none"> <li>■ Suspension of the supplier from requests for quotes and new orders.</li> <li>■ Decision regarding the execution of supplier development steps on-site at supplier's facility</li> <li>■ Appointment of an alternative supplier, if necessary</li> </ul>

### Course of the escalation process:

MAHLE's escalation process is broken down into three escalation levels, each of which basically follows the procedure outlined below:

- Analysis of escalation causes and problem
- Decision regarding measures to be implemented (e.g. 8D report, audit)
- Agreement on an action plan to eliminate the escalation causes
- Implementation of the action plan by the supplier
- Monitoring of the implementation process by MAHLE, followed by escalation to the next level or de-escalation, depending on outcome



## General supplier guidelines

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