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Technology with Vision

HELLA QUALITY MANAGEMENT

GUIDELINES FOR SUPPLIERS (HP-C-509)

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CONTENTS

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1 | INTRODUCTION

A world of continuously changing customer expectations and worldwide competition requires continuous improvement of all products and services as well as business processes and corporate procedures.

Customer satisfaction through quality in all aspects is a crucial success factor for HELLA as a SUPPLIER of complex products for the international automotive industry and consequently for you as our contractor (termed “SUPPLIER” hereafter), whose products are used in HELLA assemblies.

The achievement of zero defect(s) quality for all supplies is an absolute prerequisite which can only be achieved and secured through the common efforts of HELLA and its SUPPLIERS:

Avoiding defects instead of discovering defects and continuous improvements in the entire supply chain, customer inquiry, offer, order, product development, start of production, volume deliveries and field operation are indispensable requirements which we must and want to fulfil with the active help of our SUPPLIERS.

This guideline highlights HELLA’s basic requirements for SUPPLIERS and also refers to the valid international standards, methods and implementation instructions (e.g. by VDA) which are necessary to achieve common objectives. Customer requirements may exceed HELLA’s basic requirements and have to be followed as part of our customer’s satisfaction policy.

Area of application

The guideline is binding for all products and services supplied by a SUPPLIER to HELLA KGaA Hueck & Co, or to a company associated with HELLA where HELLA has the majority share and is part of “Framework Supply Agreement for the procurement of manufacturing materials”, “HELLA General Terms of Purchasing” or comes into operation by individual agreements.

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2 | HELLA'S QUALITY AND ENVIRONMENTAL POLICIES

The following extracts from HELLA's quality and environmental policies should provide the SUPPLIER an orientation which focus has to be considered with regard to these subjects.

The benchmarks for HELLA's actions are customer satisfaction through first-class quality of all products and services, as well as cooperative work and a high level of expertise.

The **zero defect(s) quality** of our products, actions and services, combined with expertise, innovation and internationalism, will secure the satisfaction of all customers in the long term, and thus our competitiveness.

HELLA QUALITY POLICY

Quality is the no-compromise fulfillment of all product characteristics and work procedures agreed with the customers. The target is zero defects for delivered quality during the product life and for all HELLA services. To secure these claims and to guarantee customers consistently high quality in every respect, we plan quality down to the last detail during the development of product- and manufacturing process, using carefully chosen methods. This planning procedure is carried out independently of whether production is later to take place on HELLA premises or at the SUPPLIERS, and includes all substances and materials used, of course. After SOP, the serial quality of the product is assured and continually improved by means of accompanying quality observation and control.

Meeting customer requirements and fulfilling internal quality targets have the highest company priority.

We also expect this procedure from our SUPPLIERS, who have to have an effective, successful quality management system available.

HELLA ENVIRONMENTAL POLICY

HELLA is committed to protecting the environment. In order to implement this environmental policy, HELLA has had its plants certified according to ISO 14001 [1]. We require our SUPPLIERS to meet the relevant valid environmental legislation. We expect an effective environmental management system from our SUPPLIERS which ensures compliance with regulations and improves the SUPPLIER's environment situation continuously and efficiently. On request, the SUPPLIER must be able to demonstrate appropriate waste-avoidance, recycling and disposal concepts for both products and packaging.

Proof is recommended in the form of a certified environmental management system.

3 | QUALITY MANAGEMENT

A correlation between the SUPPLIER's organizational and technical prerequisites and HELLA's quality requirements is the basis for a successful business relationship.

In detail, HELLA requires the following from SUPPLIERS:

3.1 QUALITY REQUIREMENT AS A CONDITION FOR DELIVERY

In order to meet the high expectations of the automobile and other industries, HELLA trusts the performance and commitment of its own employees to a large extent, and expects the same attitude towards employees and partners from its SUPPLIERS. This is a major precondition for the quality capability the SUPPLIER has to prove.

QUALITY REQUIREMENT LEVELS	ACTIONS/ PREREQUISITES	METHODS, DOCUMENTS
CORPORATE CULTURE	• Co-operative, target-oriented management	• Completion and follow-up of division-related target agreements
	• Promotion of initiative and creation of opportunities for personal development of the employees	• Delegation of responsibility and competence
	• Qualification of employees and promotion of quality consciousness	• Training in tools, methods and standards see 3.2, 3.3 • Support in solving quality problems • Requirement-based employee assignment
MANAGEMENT SYSTEM	• EN ISO 9001 • Implementation of a Quality Management system according to ISO/TS 16949 requirements.	• Certification by a third party
	• ISO/TS 16949	• Training and application
	• ISO 14001	• Environment management activites or certification by a third party
	• Further development of an effective procedural organization	• Management Manual
	• Creation of organizational and technical requirements for collecting and evaluated quality information	• CAQ (Computer-aided quality) system
QUALITY ASSURANCE	• Avoiding faults • Systematic processing of faults • Avoiding repeat faults	• Small Q-control loops • Problem-solving techniques • Cause-effect analysis • Feedback to development and engineering change process
AUDITS	• Regular internal audits	• System • Process • Product
CONTINUOUS IMPROVEMENT PROCESS	• Introduction and maintenance for all products, processes and services	• Employee training • Programs, targets and reviews
SUPPLIER DEVELOPMENT	• Cooperation on partnership basis • Joint project work	• Exchange of information • Implementation of training sessions, providing methods

☐ SUPPLIER activity

☐ HELLA activity

☐ Obligation of proof towards HELLA

3.2 QUALITY PLANNING AND COOPERATION

Advanced quality planning carefully designed to avoid faults during product and process development ensues that only technically mature products are produced using capable production processes.

QUALITY PLANNING LEVELS	ACTIONS/ PREREQUISITES	METHODS, DOCUMENTS
DEFINITION PHASE	• Definition of requirements	• Requirement specification • Schedule and cost frame • Preparation of inquiry
INQUIRY PHASE	• Selection of potential SUPPLIERS	• Meeting minimum SUPPLIER requirements • System audit if appropriate • Evaluation of capability
	• Inquiry	• Inquiry documents
CONCEPT PREPARATION	• Determination of HELLA expectations	• Deep analysis of requirement specification
	• Check of specification, deadline and pricing	• Revision of contract • Feasibility study • QFD (Quality function deployment) • Benchmark analysis
QUOTATION PHASE	• Preparation of a binding quotation	• Performance specification/deadlines/prices/feasibility commitment
PLACING ORDERS	• Analysis of quotation	• Checklists
	• Placing of orders with suitable SUPPLIERS	• Binding order documents, specifications, deadlines, prices
IMPLEMENTATION OF CONCEPT	• Integration in HELLA project team	• Advanced quality planning • Control Plan
		• Process audit
	• Estimation of quality risks	• Product/Design FMEA • Fault tree analysis/risks
DEVELOPMENT	• Monitoring and evaluation of design drafts and prototypes	• Design review • Robust design • Design for manufacturing/Assembly • Design for reliability
	• Checking manufacturability	• Trial planning
PRODUCTION PREPARATION	• Estimation of possible production risks	• Process FMEA
	• Optimization of production methods and operating equipment, packaging	• Operational test run • Trial planning • Test planning
PRE-SERIES	• Checking and evaluating production reliability	• Analysis and proof of capability • for testing equipment, machines and processes • Full-Run test/process audit • Cleanness requirement according to specification
	• Minimization of probability of faults	• Plans of Action
SERIES PRODUCTION START-UP PHASE	• Series production approval at SUPPLIERS	• Measurement sequence and SPC
		• Process release
		• Initial sample inspection report/PPAP • Define limit samples
RELEASE OF SUPPLY PHASE	• Release by HELLA • SUPPLIER assessment	• Release report • Q-performance, flexibility, delivery reliability, cooperation

☐ SUPPLIER activity

☐ HELLA activity

☐ Obligation of proof towards HELLA

3.3 QUALITY CONTROL IN SUPPLIER'S SERIES PRODUCTION, CONDITIONS FOR DELIVERY

The quality assurance actions in the series production are based on knowledge gained during the development phase and observation of the field of comparable products, and are used to consolidate and continuously improve the level of quality achieved.

Self-regulating processes and automated tests should be used wherever it makes technical and economical sense.

Employee quality responsibility must be further developed in line with technical progress and customer expectations.

AREAS OF QUALITY CONTROL	ACTIONS/ PREREQUISITES	METHODS, DOCUMENTS
PROCUREMENT	• Securing of delivery quality	• Evaluation of quality performance
		• Acceptance material test certificates in compliance with DIN EN 10204 (Types of inspection documents) • Evaluation of supply reliability
PRODUCTION	• Control of machine parameters	• Process data sheets • Self-regulating processes
TESTS	• Continuous supervision of process capability	• SPC/control chart technique
	• Rapid recognition and elimination of deviations	• Operator self control
	• Recording and evaluating quality data	• Results using suitable IT programs
		• Pareto analysis
	• Securing machine availability	• Preventative maintenance
	• Ensuring proper packaging	• Packaging plan
	• Clear marking of all parts and packages	• ERP system
COMPLAINTS PROCESSING	• Cause-Effect analyses • Corrective and preventative measures • Avoiding repeat faults	• Problem-solving techniques such as e.g. DMAIC, 5-Why, Ishikawa ...
		• 8D Report
STORAGE AND TRANSPORT	• Correct and fault-free handling, storage and transport	• Computer-supported forced workflows
	• Consideration of manufacturing data and expiry dates where applicable	• FiFo principle

SUPPLIER activity

HELLA activity

Obligation of proof towards HELLA

4 | IMPLEMENTATION OF BASIC REQUIREMENTS

The most important HELLA requirements from the quality management process described which have to be met and documented by the SUPPLIER before the beginning of the business relationship and/or during current business have been detailed out and will be described below:

4.1 QUALITY MANAGEMENT SYSTEM (QM-SYSTEM) AND QUALITY CAPABILITY

The SUPPLIER has effectively introduced a QM system in his company and thus proves his quality capability.

A Quality Management System that is aligned to the requirements of ISO/TS 16949 [11] is a prerequisite for a SUPPLIER relationship with HELLA.
The minimum requirement is a certificate on the basis of the respectively valid version of EN ISO 9001 [2]. HELLA recommends third party certification in compliance with ISO/TS 16949 and ISO 14001 (Environment Management System).

Additional requirements can be defined according to VDA Volume 6, part 1{8} or the AIAG documents. Specific customer documents may also have to be heeded.

The efficiency of the QM system is mirrored in:

- Continuous and provable improvement of all business and manufacturing processes and products
- Delivery quality
- Supply reliability
- Continuous field observation of its products and commitment to provide customer information when requested.
- Efficiency and speed in implementing corrective actions
- Communication on all levels
- Processing of new products and changes to serial products professionally and in line with schedules.

At least 3 months before the expiring date of a certificate, HELLA must be informed in case no re-certification is planned. New certificates must be sent to the HELLA Material Group Manager or Purchasing contact without a separate request having to be made. In case of a revocation of the certificate, HELLA must be informed immediatly. HELLA reserves the right to carry out audits on quality management systems, processes and products at short notice, with the customer if appropriate, following prior announcement. The auditor must be granted access accordingly.

The SUPPLIER must ensure that his sub-SUPPLIERS also meet the above-mentioned requirements. As proof, the SUPPLIER must be in a position to present the valid certificate issued by an accredited certifying company (3rd party audit).
If the SUPPLIER places orders with sub-contractors, these must also meet the requirements of this guideline. HELLA must be informed in good time about the use

of and change in sub-contractor and must approve this. A production process and product release must be carried out. HELLA reserves the right to audit the sub-contractor at short notice, with the customer if appropriate, following prior announcement. This does not release the SUPPLIER from his responsibility towards the sub-contractor and HELLA, however.

4.2 FURTHER BASIC QUALITY PRINCIPLES

In addition to the standards listed, HELLA ordering documents are binding, e.g.

- Order drawings including the requirements these specify such as DIN standards, HELLA standards, technical conditions of delivery, data sheets etc.
- Agreed test instructions and testing equipment
- Additional order details e.g. packaging regulations
- Special legal requirements
- Special requirements related to environmental protection and recycling.

4.3 DELIVERED QUALITY AND INCOMING GOODS

The products need to be free of any design, material or processing defects and must comply with the specifications and properties contractually agreed. The SUPPLIER has to bring proof of composition of the materials used and their individual components as well as environment-related aspects.
For all products requested, a material data sheet must be published or preferably sent to HELLA in the IMDS (International Material Data System) or in other systems which must be used for specific markets, like CAMDS (Chinese Automotive Material Data System).
Missing or incorrect material data sheets (MDS) lead to a rejection or only to a provisional initial sample release.

HELLA assumes that all substances for use in products delivered to HELLA (e.g. raw materials, process materials, components, assemblies) that require registration in line with REACh (EC directive 1907/2006: Registration, Evaluation and Authorization of Chemicals) have been pre-registered by the supplier or sub-supplier and then registered at HELLA for the purpose of application within the time window prescribed by REACh. If, contrary to expectations, this is not the case, HELLA must be informed immediately.
Caused by REACh every supplier of a product (including packaging) has to declare to HELLA all SVHC-substances (Substances of Very High Concern) within the product, which are in a concentration bigger than 0.1 % percent by weight included. SVHC-substances are in a EU publication listed, this list is permanently enlarged. The Supplier must keep himself informed at all times about the current candidate list status.
Regardless of legal prohibited substances and standards to substance restrictions in the automotive industry, additional substance restrictions and prohibitions are defined in the HELLA standard HN20103 [14], e.g. for technical reasons.

A quality control report is used to inform SUPPLIERS about non-conforming deliveries. The costs incurred to HELLA for this report are to be borne by the SUPPLIER. Scrapping and reworking costs are recorded by HELLA and charged to the SUPPLIER.

Cost recovery will be communicated, if applicable, with each claim through a cost breakdown. The cost recovery process will include, but is not limited to, contaminated stock at HELLA affected plant, products in transit, OEM assembly plant, non-conforming received goods, assembly line downtime due to delivery or quality related issues, warranty returns, and costs required to analyze and rectify the effects of a quality, warranty, launch or delivery issue which result in a concern. Inspection costs, analysis costs, rectification costs, transit costs and costs to manage the implementation of a non-reversible corrective action may also be included. Level of cost recovery against concerns will be a significant factor in HELLA sourcing decisions.

The QM system introduced at the SUPPLIERS and the quality assurance process derived from this are the basis for the ability of the SUPPLIER to achieve freedom from defects in all the products and services delivered by the SUPPLIER or on his behalf (“zero defect(s) quality”).

HELLA will report defects in the delivery to the SUPPLIER immediately as soon as they have been determined according to a proper course of business. At HELLA, incoming goods inspection is restricted to a visual inspection of the transport packaging for external signs of damage, e.g. transport damage, a quantity check and an identity check on the basis of the comparison of the delivery papers with the order documents. Further tests, in particular measuring tests, do not have to be performed. To ensure the quality of its own products, HELLA also has an efficient QM system in place. Within this context, HELLA carries out device-specific tests accompanying production in compliance with the requirements of the QM system in order to guarantee the earliest possible detection of defects in its pro-duction including the integrated delivery and performance scopes of the SUPPLIERS.Insofar, the SUPPLIER waives its objection of belated notice of defect.

The HELLA part number incl. revision status according to the HELLA drawing, must be quoted on the delivery note and the smallest packaging unit. If there is no revision status noted on the drawings, the issue level according to the delivery schedule or order must be quoted.

4.4 COMPLAINTS PROCEDURE, 8D REPORT

The SUPPLIER has to reply to every complaint within 10 working days using a **significant 8D**:

- 24 hours: quick response e.g. containment actions at HELLA
- 48 hours: containment actions fully implemented (D3 completed and sent to HELLA)
- 10 working days: root cause analysis done for occurrence & non detection, permanent corrective actions defined and implemented (D4&5 sent to HELLA)
- 20 working days: effectiveness of permanent corrective actions checked and recurrence prevented (D6&7 sent to HELLA)

Within 24 hours of notification, the SUPPLIER must authorize HELLA to sort, scrap, rework or return the non-conforming materials (at the SUPPLIERS' expense). If the SUPPLIER does not respond to the request within 24 hours, HELLA can make disposition. Any costs associated with the packaging, shipping preparation, and material handling of non-conforming materials will be charged back to the SUPPLIER.
HELLA will not manage SUPPLIER sorting using an outside source. SUPPLIERS are responsible for outside sources and must make all arrangements to ship parts between HELLA affected plant and outside source. The SUPPLIER will also be responsible for inspecting and monitoring the quality of sorted parts.
Reworked parts must meet specifications. The repairing of parts is not permissible without prior written authorization by HELLA.

The 10 working days period can be shortened by HELLA, if necessary. Interim containment measures must be initiated immediately and reported

- to guarantee delivery of fault-free goods
- to keep costs for the SUPPLIER and HELLA as low as possible.

Interim reports must be presented on time if requested.
HELLA has to be informed in writing in advance of any possible delays. The SUPPLIER must examine the products complained about carefully (defect-cause analysis). He has to summarize the results and planned corrective actions including deadlines for their implementation in an 8D Report without delay (according to the 8D Report form on the HELLA website) and forward this to HELLA. Proof must be provided to HELLA of effective implementation of the corrective actions.
A root cause analysis always needs to be carried out using suitable problem-solving methods. Detailed analyses (such as Ishikawa, 5 why, error simulations) have to be provided.

Subsequent deliveries after a previous fault must be marked accordingly until it has been proven that the fault has been remedied. The type of marking on the individual part needs to be agreed with the HELLA receiving plant.

HELLA reserves the right to carry out an audit at the SUPPLIER's premises, with prior announcement, in case of problems caused by the SUPPLIER and unacceptable reaction time, and to charge the costs incurred to the SUPPLIER.

4.5 QUALITY DOCUMENTATION

Documents and records from the product and process development phase, as well as from the production phase of the delivered product, must be presented on request. In particular, the results of the quality tests carried out at the SUPPLIERS' and their sub-SUPPLIERS' and the audit results must be documented, including planned and effectively implemented corrective actions, and provided to HELLA or HELLA's customer on request at any time. Any deviations from this procedure must be agreed between the partners at the time at which the contract is concluded. For parts with special characteristics and increased documentation requirements (refer here also to VDA Volume 1[4] or ISO/ TS 16949), quality records must be stored at the SUPPLIERS' and his sub-contractors' for at least 15 years after EOP.

For all other characteristics, a sensible documentation system must be set up as described in VDA Volume 1 (proof methods) or ISO/ TS 16949.These specifications do not replace legal requirements. Longer storage times are recommended, bearing in mind the limitation periods for product liability claims.

4.6 QUALITY AGREEMENTS AND PPM MANAGEMENT

With regard to the operational implementation of the strategic "zero defect(s) quality" target, HELLA and the SUPPLIER agree quantifiable objectives for the quality of deliveries (ppm target agreements) in relation to a period to be defined.

The target value is specified in

$$\text{Fault share [ppm]} = \frac{Defective\_parts}{Number\_of\_delivered\_parts} \cdot 1000000$$

(ppm = parts per million / maximum number of defective parts per million delivered)

To simplify communication and wherever technically practical and feasible, only one target value should be agreed for each product family delivered by SUPPLIERS or if possible for all products delivered.

The ppm results are recorded at HELLA, advised to the SUPPLIER and part of SUPPLIER evaluation. At the same time, they form the basis for specific actions for continuous improvement of quality.

The agreement on ppm values does not acknowledge a quality level accepted by HELLA. All purchasing parts which are recognized as defective will not be accepted and will be charged to the SUPPLIER.

4.7 ENGINEERING CHANGE MANAGEMENT/Q-PROBLEMS

The SUPPLIER is obliged to inform HELLA about any quality problems or block-ing of products or processes immediately and in writing, usually before the products are delivered, and to agree the necessary corrective actions with the Quality Assurance of the HELLA production plants.

The SUPPLIER must inform HELLA as soon as possible, but at least 9 months prior to the introduction of the change, of any technical changes he intends to introduce for the delivery of released contractual objects.
HELLA reserves the right to carry out tests and a release process before the change is implemented.

The SUPPLIER informs HELLA Purchasing before carrying out all the planned changes in products and processes, both before and after SOP (Start of Production), e.g. in case of:

- Changes in design, specification and material
- Use of new, modified or replacement tools
- Changes in manufacturing methods or production processes
- Relocation of production within a manufacturing location or to other locations
- Changes in SUPPLIERS of products, components, materials, services or software
- Restart of production equipment after closure of more than 12 months.

The SUPPLIER is also obliged to inform HELLA if one of the above points is applicable to a sub-SUPPLIER.

In case of changes, which according to the latest IMDS Recommendation 001 require an update of the IMDS data sheet (respectively CAMDS or other national registration systems), those updates need to be provided immediately.

The SUPPLIER defines the scope of new approval tests (initial samples) with HELLA. He makes sure that serial production deliveries to HELLA are carried out only after the initial samples have been approved by HELLA (see section 5.10). The changes are to be documented in the part life cycle.

If old versions still exist at the time the change is made, HELLA must be informed of the quantities bound by purchasing obligation so that a decision can be taken about their use.

After changes, the first deliveries must be specially marked on the delivery note, containers and parts themselves, if appropriate. Details of this must be agreed in writing between HELLA and the SUPPLIER before the parts are delivered.

4.8 CONTINUOUS IMPROVEMENT PROCESS

The SUPPLIER has introduced a structured process of continuous improvement for all products, processes, workflows and services in his company. He can prove that it is used for the products delivered to HELLA and the activities connected with this business relationship. Its effectiveness is proved by continuous improvement of the quality performance, prices, delivery performance, flexibility and cooperation. HELLA is shown the respective programs and actions for continuous improvement on request.

4.9 PREVENTIVE MAINTENANCE

The SUPPLIER shall employ a defined system for carrying out planned total preventive maintenance. This shall include having replacement parts available for key manufacturing equipment. A maintenance plan must be established and documented which includes the maintenance intervals and the extent of the maintenance.

4.10 COMMUNICATION

HELLA's official language is English. Unless otherwise approved by HELLA SUPPLIER Quality and Purchasing departments, all official communications with HELLA will be done in English.
Documents may display the native language when integrated with parallel translation. If this is done, only the English translation is valid.
HELLA expects SUPPLIERS to be available for technical support within the context of discussions at customers, on their own premises, or at HELLA.

5 | QUALITY IN THE TIME-TO-MARKET PROCESS

We have made it our task to involve our SUPPLIERS in the quality planning of a new project as early as possible. We always require our SUPPLIERS to carry out systematic quality planning within the context of project management. This planning includes both the parts manufactured by the SUPPLIER and his purchased parts.

The person responsible for the project at HELLA must be named. At least all the planning steps listed below must be carried out by the SUPPLIER for the respective part or project.

5.1 FEASIBILITY STUDY

Technical documents (e.g. drawings, specifications, environment requirements, packaging regulations, requirement specification etc.) prepared by HELLA must be analyzed and evaluated by the SUPPLIER in the context of checking the contract. This check provides the SUPPLIER with the possibility of submitting his experience and suggestions to the advantage of both sides. A feasibility study must be presented to Purchasing, together with the quotation, and is a prerequisite for order placement.

In addition, after SUPPLIER nomination, HELLA might carry out together with the SUPPLIER a detailed "Charateristic Based Feasibility Study" (CBFS) with regard to every characteristic on the drawing.

5.2 ADVANCED QUALITY PLANNING

To ensure "zero defect(s) quality" in all phases of the cooperation, the SUPPLIER is obligated to draw up a binding advanced quality plan for prototypes, pre-serial samples and serial production deliveries, to document this in test sequence plans (Control Plan) and to coordinate it with HELLA.
The Control Plan is in accordance with the requirements of ISO/TS 16949, annex A. It must be agreed in advance if the advance quality planning should meet the requirements of VDA, Volume 4, Part 3, or the AIAG documents (APQP/Advanced Product Quality Planning).
The commitment to "zero defect(s) quality" and therewith to defect prevention as well as to continuous improvement is an essential part of the contract and valid without any acceptance.

5.3 PLANNING CONTENTS

- Scheduling
  The SUPPLIER draws up a project-related schedule on the basis of the deadlines presented by HELLA. The schedule is updated regularly by the SUPPLIER during the whole project phase and presented to HELLA if requested. Potential deviations from the schedule have to be indicated by the SUPPLIER in good time and agreed with HELLA.
- Work/production flow chart
  The SUPPLIER prepares a production flow chart for the whole process chain. Work plans have to be drawn for all component parts and components. These must contain complete information of process steps, internal and external transportation, means of transport as well as the machinery and equipment used. Manufacturing and raw part drawings as well as process descriptions have to be drawn as required.
- Reliability requirements
  The reliability requirements contained in the requirement specification/drawing must be implemented with the aid of suitable methods of reliability management and validated on the basis of respective reliability tests and evaluations.

5.4 PRODUCT AND PROCESS FMEA

Taking the application of his products at HELLA and HELLA´s customers into account, the SUPPLIER carries out preventive risk analysis (FMEA) for all products delivered to HELLA and the processes linked with these, and updates the FMEA whenever deviations of product and/or process quality occur as well as when changes are made as described in section 4.7. All parameters affecting product safety must be integrated in the analysis. Points evaluated as critical must be improved in the short term by means of suitable corrective and preventive actions to enable specifications, properties and product safety as well as capable manufacturing to be guaranteed. To implement the actions, deadlines, and responsible persons have to be named and proved if required.

Independently of the product and process FMEAs prepared on his own responsibility, the SUPPLIER agrees to cooperate in the system or interface FMEAs initiated by HELLA. Results must be taken into account in the SUPPLIER's further development process.
The SUPPLIER shall make PFMEA available for review on HELLA's request.

Details are defined in VDA Volume 4[6], Part 2, as well as in the AIAG documents. Results must be recorded as described in section 4.5.

5.5 CONTROL PLAN

Within the Control Plan, the results of the Product-FMEA, Process-FMEA, experience with similar processes and products as well as the utilization of methods of improvement have to be considered. A detailed description of the procedure of drawing up a Control Plan is available in VDA Volume 4 and in the AIAG documentation (APQP).

Based on the Control Plan, the SUPPLIER assures compliance with all the routine tests, taking the agreed measurement and inspection equipment as well as the sampling scheme into consideration.

The Control Plan and all other related documents (records of part and process approvals as well as inspection results) have to be provided to HELLA on request.

5.6 PLANNING SERIAL PRODUCTION

The planning of lines and operating equipment includes the planning and manufacturing/procurement of all the operating equipment required to produce the component. The capability or suitability of operating equipment must be proved. Capabilities must be proved individually for multiple jigs or molds. Care must be taken that operating equipment in sufficient capacity and function is available at the latest when off-tool parts are produced at the sampling date. Internal and external means of transport and packaging must also be taken into consideration.

COORDINATION OF SERIAL MONITORING

All product and process characteristics are important and must be kept in a reliable process. Special characteristics require the proof of process capability. For this purpose, the SUPPLIER must use suitable methods e.g. quality control cards (SPC) to monitor these characteristics. If process capability cannot be proven, a 100% test must be carried out. Characteristics that cannot be measured or only measured in a destructive test must be monitored and documented using suitable methods.

LIMIT SAMPLES

Where necessary, limit samples must be agreed between HELLA and the SUPPLIER. In the case of decorative parts, this is obligatory.

5.7 CAPABILITY OF TESTING EQUIPMENT, MACHINES AND PROCESSES

By applying suitable statistical procedures, the SUPPLIER must ensure that the used machines, tools, measuring and test equipment as well as the processes in which these are introduced are suitable and capable for the production of products supplied to HELLA.

The characteristics for which capability studies have to be provided will be agreed between HELLA and the SUPPLIER. However, this does not release the SUPPLIER from his responsibility of defining further characteristics related to his processes or characteristics of the sub-SUPPLIERS.

CAPABILITY OF TESTING EQUIPMENT

For all characteristics, the SUPPLIER defines the testing method with the appropriate testing equipment. For the planned measuring equipment a suitability of the test-process has to be proven. The measuring process and the tolerances of the characteristic to be measured has to be considered for this.
Proof has to be brought in accordance with the requirements of VDA Volume 5 [7] (test process suitability) or AIAG.

PROOF OF MACHINE AND PROCESS CAPABILITY

The investigation of machine capability and process capability are basically described in VDA, Volume 4, Part 1, and must be performed according to this.

The following capability indices can be agreed for special characteristics or process parameters.

Short-term/machine capability index: Cmk ≥ 2.0
Note: here, a large number of random checks is taken and evaluated within a short period of time.

Preliminary process capability index: Ppk ≥ 2.0
Longterm process capability index: Cpk ≥ 1.67
Note: here, smaller numbers of samples are taken and evaluated over a longer period.

For all other agreed special characteristics, the following capability indices are binding:

Short-term/machine capability index: Cmk ≥ 1.67
Preliminary process capability index: Ppk ≥ 1.67
Long-term process capability index: Cpk ≥ 1.33

If these minimum requirements are not met, 100% tests must be carried out until the capability is achieved through corrective actions. Deviations from this must be agreed with HELLA.
The requirements of the special characteristics are specified in HN 20037 [15] (Guideline for the Uniform Marking of Special Characteristics and their Verification Requirements).

5.8 STATUS OF SUB-SUPPLIERS AND THEIR PRODUCTS

The use of sub-SUPPLIERS that meet the quality requirements has to be guaranteed for the project and is the responsibility of the SUPPLIER. In case of nonperformance, sub-SUPPLIER development programs have to be set up. Implementation must be guaranteed before the start of series deliveries at the latest.

The status of quality planning for purchased parts must be reported regularly. The production process and product release of products from sub-SUPPLIERS has to be concluded before production process and product release of HELLA SUPPLIERS.

5.9 AUDITS

The SUPPLIER has to carry out internal planned audits (e.g. VDA Volume 6, Part 3 [9]) for all the products delivered to HELLA and all the processes linked with their development and production at regular intervals, planned annually in advance. This is based on contractually defined product specifications and properties as well as further agreements affecting the deliveries, e.g. logistics and packaging. In the event of deviations, the SUPPLIER initiates all the corrective actions necessary and ensures their effective and long-term implementation.

In addition, HELLA and its customers are authorized to carry out process, product or system audits with advance notice in order to check whether the SUPPLIER's quality assurance and environmental requirements meet the HELLA require-ments.

If quality problems occur which are caused by performances and/or deliveries of the SUPPLIER's sub-contractors, the SUPPLIER must carry out an audit at the sub-contractor's if requested to do so by HELLA, with HELLA participation if ap-propriate, and present the results to HELLA.

5.10 APRODUCT AND PROCESS RELEASE

For product release, the SUPPLIER is obligated to submit initial samples to HELLA before the start of serial production; these samples must comply with all the specifications and properties specified in the contract:

- Dimensions
- Materials and processing
- Applications/functional interface
- Limit samples
  Unless agreed otherwise, this proof must be brought on at least 5 parts/cavity.

This allows any deviations to be corrected in good time, thereby preventing systematic errors in serial production.

Without part and process approval any series deliveries are forbidden. Initial samples and all component parts and materials used for their production, have to be produced under series conditions with series equipment without any exception. Reference samples from initial sampling must be kept by the SUPPLIER for at least 15 years after EOP, unless otherwise agreed in writing.

For ISIR submission, HELLA requests the SUPPLIERS to use the ePPAP (electronic supported procedure of the Production Part Approval Process), unless otherwise agreed.
The content and complexity of necessary documents must be discussed with the HELLA Purchasing department for the specific project.
It has to be decided in advance which bases for initial sample reports have to be used: VDA, Volume 2[5] or AIAG documents. The respective submission level must be defined.

The alignment points given on the drawing must always be considered. If the HELLA drawing does not contain this information, the alignment points determined during measurement must be recorded by the SUPPLIER in the release documentation [ISIR].

The process release at the SUPPLIER's is granted when a process audit according to VDA Volume 6, Part 3, has been passed successfully with rating A, as well as after a full-run capacity test passed according to HELLA guidelines. A process release can also be granted in the case of a B rating. An improvement plan must be drawn up and processed for the open points.
HELLA reserves the right to carry out the process audit and full-run test, or request the results of the process release, at the SUPPLIER's and at the sub-SUPPLIER's if necessary.

For standard parts as well as products for the aftermarket, releases can be agreed on the basis of "SUPPLIER data sheets" upon request and requirement by HELLA Purchasing.

After the approval of the Production Part Approval Process (PPAP) package, and with the start of serial production, the SUPPLIERS should participate in Safe Launch Planning under the direction of their assigned SQA.

5.11 TRACEABILITY

The SUPPLIER is obliged to guarantee the traceability of the products he supplies.

The products must be marked or some other suitable method chosen to ensure that in the event of a defect being discovered, all other products which could be defective can be identified and blocked until subsequent measures have been agreed between the SUPPLIER and HELLA. These requirements must be cascaded down to the complete supply chain.
Product specific traceability requirements will be detailed out in additional documents.

5.12 RE-QUALIFICATION TEST

Contents, complexity and intervals are agreed between HELLA and the SUPPLIER before the start of series production and documented within the Control Plan. If there is no agreement, re-qualification tests have to be carried out at least once a year.

In the event of negative test results, the reason for the defect must be determined, corrective actions initiated and the Quality Assurance staff in the Incoming Goods department of the plant to be supplied must be informed immediately.

Unless otherwise agreed, the respective requirements from ISO/TS 16949 or the AIAG documents are valid. All products are subject to a complete dimensional and functional test, in accordance with the Control Plan, taking the customer's specifications for material and function into account. The SUPPLIER provides HELLA with the documentation within three working days on request.
After previous agreement with HELLA, for parts that are similar for HELLA, the requalification can be carried out per product group ("family").

5.13 FUNCTIONAL SAFETY

As far as the scope of the SUPPLIER's product development tasks for electronic components, assemblies and complete devices include software development, the SUPPLIER shall in particular comply with the requirements of "Functional Safety" according to ISO 26262 [12] (FuSa).
The services to be provided by the SUPPLIER shall be performed on time as required and in a professional manner by qualified personnel in accordance with the relevant requirements of FuSa.
The FuSa-Organization of the SUPPLIER shall constantly be further developed and adjusted to the actual requirements of FuSa and be staffed with sufficient qualified personnel (e.g. Safety Managers).
Any releases required by FuSa shall be made in writing by responsible FuSa managers. On HELLA's request FuSa organization and -qualification shall be demonstrated at any time in writing in a standard form as applicable.

5.14 QUALITY REQUIREMENTS FOR DEVELOPMENT OF EMBEDDED SOFTWARE

Embedded software developed and delivered to Hella either as a work product or a product delivered which contains embedded software shall satisfy Automotive SPICE Level 2 (HIS scope – Hersteller Initiative Software) unless otherwise specified by Hella.

It is a requirement of Hella that:
a) the supplier produce and provides evidence of a self-assessment and/or
b) the supplier agrees to be audited by Hella assessors upon request or
c) upon Hella request, a third party assessment is conducted (by certified Automotive Spice Assessor) on supplier costs

If the supplier does not meet the above requirements at start of an awarded project, an improvement program must be established to meet Hella requirements before start of serial production. A regular progress reporting of the improvement project to Hella is requested.
More details are defined in Hella Norm HN20146 [16].

6 | METHODS OF SUPPLIER ESCALATION

6.1 ESCALATION PROCESS FOR SUPPLIERS

In case of quality or logistic problems (e.g. non-successful complaint management of the SUPPLIER, long-term and/or multiple cases of missed target agreements, customer complaints due to defective purchased parts, ...) occur repeatedly at the SUPPLIER's, they are included in the HELLA escalation process. The aim of the process is to implement suitable actions at the SUPPLIER's so that the products and materials delivered meet HELLA requirements again. Depending on the duration and seriousness of the problems, they are classified in one of three escalation levels.

The basic procedure for each level is as follows:

- **Analysis** of the escalation cause and of the problem.
- **Agreement on an action plan** to eliminate the causes of the escalation, in order to flowget the quality back in line with targets.
- **Implementation** of the action plan.
- **Monitoring/tracking** of the action plan.
- Depending on the effectiveness of the actions, either **escalation or de-escalation** takes place to the next level.

If the subjects and actions are not processed efficiently by the SUPPLIER, HELLA retains the right to compel the SUPPLIER to obtain external help from a competent service provider.

Escalation level 1: Escalation level 1 is activated when the problems cannot be processed satisfactorily within the scope of normal workflow. In the course of the escalation process, the SUPPLIER has to set up an effective problem-solving process and present this to the Quality department of the HELLA production plant regularly on site.

Escalation level 2: In escalation level 2 the action plan is monitored on site at the SUPPLIER's to make sure it is adequate and effective. This shall take place within the context of quality and/or logistics audits. The results of the onsite analysis are documented in an action plan. The SUPPLIER is responsible for implementing the actions and has to report to those responsible about the respective status at regular intervals.

Escalation level 3: If the quality requirements in escalation level 2 are not fulfilled, the SUPPLIER is classified under escalation level 3. This means the SUPPLIER is blocked for new inquiries and placement of orders for all HELLA companies world-wide. HELLA also reserve the right to forward the information to the SUPPLIER's certification authority.

At escalation level 3 the existing problems are analyzed by a HELLA team on site. The SUPPLIER must be prepared to support all activities of the HELLA team. The SUPPLIER's general management must ensure the compliance with all the actions agreed.

In order to guarantee the implementation and effectiveness of the planned actions, progress is supervised and documented on the basis of regular reviews.

Escalation level 3 ends with de-escalation. If a SUPPLIER support project does not run successfully and the reason for this is caused by the SUPPLIER, a re-positioning of this SUPPLIER in the portfolio of HELLA Purchasing will take place.

6.2 ADDITIONAL CONTROL LEVEL

The "additional control level" is an additional inspection of purchased parts. The purpose of this process is to implement a filter which avoids defective purchased parts caused by poor SUPPLIER quality performance arriving at HELLA production lines

ACL 1 (Additional control level 1): ACL 1 requires an additional 100 % inspection of the material to be provided by the SUPPLIER. The appropriate testing station must be separated from production (minimum distance 10 m). The test results must be documented every day at the testing station. The marking of the purchased parts checked by the SUPPLIER must be agreed between HELLA and the SUPPLIER.

The SUPPLIER must report the inspection results regularly to HELLA according to ACL report (HELLA form 1280).

ACL 2 (Additional Control Level 2): ACL 2 requires an additional inspection of the purchased parts by an independent service provider representing HELLA interests. The SUPPLIER pays the costs incurred for this inspection. The selection of the service provider must be agreed with HELLA, since customer requirements (OEM) must be taken into account.

A weekly report of the inspection results must be sent to HELLA by the service provider according to ACL report (HELLA form 1280).

To revoke ACL 1 / ACL 2, all the following conditions must be met:

- Preventative measures must be implemented and their effectiveness proved.
- At least four weeks of defect-free additional 100 % test
- or at least as many defect-free parts during the additional 100 % testing as would make up 5 delivery batches.

7 | SPECIFIC REQUIREMENTS FOR ELECTRONIC COMPONENTS

7.1 RELEASE OF ELECTRONIC COMPONENTS:

The following proofs are to be provided by the SUPPLIER for all new electronic components to be introduced at HELLA:

- Successful implementation of the release test according to the qualification guidelines of AEC-Q100/101/200 (more detailed tests must be carried out in addition if required)
- Complete proof methods according to PPAP Level 3

Furthermore, all the requirements documented in "HELLA Requirements for Electronic Components" HELLA Norm HN-67500 [13] must be met.

7.2 PROOF OF PROCESS CAPABILITY:

Process capabilities, in accordance with section 5, must be proven for electronic components for all functional, safety and quality-related processes.
In addition, the use of statistical methods such as Part Average Test and Statistical Bin Analysis are a pre-requisite to support the zero defect(s) strategy.

8 | APPLICABLE DOCUMENTS, LITERATURE

Details on the standards and methods of Quality Management specified in this guideline can be found in the respectively latest version of the following documents.

Send your request to

HELLA, Central Purchasing
Corporate Purchase Management (CPM)
Quality Management
Rixbecker Str. 75
59552 Lippstadt/Germany
Tel.: +49(0)2941/38-0
Fax.: +49(0)2941/38-31327
Internet: www.HELLA.com

who will be glad to help with the interpretation and introduction of methods and standard requirements.

Source for standards
Beuth Verlag GmbH
Postfach 11 45
D-10772 Berlin
www.beuth.de

[1] ISO 14001 Environmental management systems
[2] EN ISO 9001 Quality management systems – Requirements

Verband der Automobilindustrie e.V. (VDA) – German Association of the Automotive Industry

VDA source
Verband der Automobilindustrie e. V. (VDA)
Quality Management Center (QMC)
An den Drei Hasen 31
D-64110 Oberursel
www.vda-qmc.de

[4] Volume 1 Documentation and Archiving – Code of practice for the documentation and archiving of quality requirements and quality records
[5] Volume 2 Quality Assurance for Supplies Production process an product approval PPA
[6] Volume 4 Quality Assurance in the Process Landscape
[7] Volume 5 Capability of Measurement Processes; Capability of Measuring Systems
[8] Volume 6 (Part 1) QM system audit
[9] Volume 6 (Part 3) Process audit
[10] Volume 6 (Part 5) Product audit
[11] ISO/TS 16949 Quality management systems Special requirements when EN ISO 9001 is used for series and service parts production in the automotive industry.
[12] ISO 26262 Road vehicles – Functional safety

National legislation

■ 2000/53/EC (ELV)	EU-Directive on End of Life Vehicles
■ 2011/65/EU (RoHS)	EU-Directive on the restriction of the use of certain hazardous substances in electrical and electronic equipment
■ (EC) No. 1907/2006 (REACh)	EU Regulation concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals
■ AEC-Q100	Failure Mechanism Based Stress Test Qualification for Integrated Circuits

HELLA Regulations

[13] HELLA Regulation HN67500:	HELLA Requirements for Electronic components
[14] HELLA Regulation HN 20103:	Restrictions and prohibitions of substancees
[15] HELLA Regulation HN 20037:	Guideline for the Uniform Marking of Special Characteristics and their Verification Requirements
[16] HELLA Regulation	Guidelines for Software Suppliers

The HELLA documents referenced throughout this Manual can be found under Purchasing Philosophy documents download from the HELLA home page.

Abbreviations

Term	Definition
SOP	Start Of Production
EOP	End Of Production
CAQ	Computer-Aided Quality
FMEA	Failure Modes Effects Analysis
SPC	Statistical Process Control
PPAP	Production Part Approval Process
ERP System	Enterprise Resource Planning
DMAIC	Define, Measure, Analyze, Improve and Control
FIFO	First-In, First-Out
8D Report	Eight Disciplines Problem Solving
QM	Quality Management
AIAG	Automotive Industry Action Group
DIN Standards	Deutsches Institut für Normung (German institute for standardization)
IMDS	International Material Data System
CAMDS	Chinese Automotive Material Data System
MDS	Material Data System
OEM	Original Equipment Manufacturer
REACh	Registration, Evaluation, Authorization and Restriction of Chemicals
SVHC	Substance of Very High Concern
PPM	Parts-per-Million
CBFS	Charateristic Based Feasibility Study
ePPAP	Electronic supported procedure of the Production Part Approval Process
SQA	Supplier Quality Assurance
FuSa	Functional Safety
HIS	Hersteller Initiative Software
ACL	Additional Control Level
Cmk	Short-term machine capability
Cpk	Long-term process capability
Ppk	Preliminary process capability

9 | REVISION HISTORY

CHAPTER	CHANGE SUMMARY
1 | Introduction	■ Update of last paragraph (introduction of customer specific requirements compliance)
2 | HELLA's quality and environmental policies	■ HELLA environmental policies: revised (small changes in re-written)
3 | Quality management	■ 3.1 First paragraph revised (applicability for "other industries" intro-duced) ■ 3.1 Abbreviations explained: CAQ (Computer-aided quality), QFD (Quality function deployment) ■ 3.2 Updated points: "concept preparation", "quotation phase", "development" ■ 3.3 Abbreviation explained: DIN EN 10204 (Types of inspection doc-uments) ■ Updated ISO 9001 naming into EN ISO 9001
4 | Implementation of basic requirements	■ QS9000 compliance replaced with AIAG compliance. ■ 4.1 · Revised and re-written sentence "Continuous field observation [...]" · Revised and re-written sentence concerning "certification" ■ 4.3. · Added additional specification regarding IMDS submission · Removed the requirement: "In the case of defects of low value and minor importance, HELLA works with specified flat rate amounts." · Added "Cost recovery" detailed requirements · REACh (SVHC) compliance revised and re-written. Introduced compliance with HN20103 · Updated "zero defect(s) quality" policy; removed sentence: "Because on account of the high quality standard [...] no defects to be found in random sample testing of incoming goods" ■ 4.4 · Added detailed timing for 10 working days reply in case of complaints · Added requirements in case of sorting/ rework activities · Added requirements in regards of the usage of problem solving tools (e.g. Ishikawa, 5Why, etc) · Added requirement for marking the "subsequent deliveries after a previous fault" · Revised: "audit on the SUPPLIER's premises", done with "prior announcement" ■ 4.5 · Updated requirement regarding the storage of quality records, 15 years after EOP. · Quality documentation: added compliance with ISO/TS 16949 (alternatice to VDA) ■ 4.6 · Revised "Fault share (ppm)" formula in English ■ 4.7 · Added: "Changes in" manufacturing methods or production processes · Added IMDS requirements in case of changes · Removed the specification: "If this procedure is not followed, HELLA reserves the right to charge any related costs incurred to the SUPPLIER" ■ 4.9 New chapter introduced "Preventive maitenance" ■ 4.10 New chapter introduced "Communication"

CHAPTER	CHANGE SUMMARY
5 | Quality in the Time-to-Market process	■ QS9000 compliance replaced with AIAG compliance ■ 5.1 · Added requirement regarding CBFS (Charateristic Based Feasi-bility Study) ■ 5.4 · Added requirement regarding PFMEA submission. ■ 5.7 · Revised and re-written "special characteristics" (instead of "special and critical characteristics") · Updated naming of capabilities, according to HN20037 · Updated reference to "special" charcteristics in case of minimum capability requirements :"For all other special characteristics [...]" · Removed "temporarly" in case of "minimum requirements not, 100% tests must be carried out [...] · HN 20037 (Guideline for the Uniform Marking of Special Characteristics and their Verification Requirements) introduced ■ 5.9 · Revised sentence "The supplier has to carry out [...]" · "In addition HELLA and its customer [...] revised (small changes in re-written) ■ 5.10 · Revised requirement for proof measurement quantity: "5 parts/cavity" · Added requirement regarding the "reference samples from initial sampling" · Added requirement regarding ePPAP usage (electronic PPAP) · Revised: "process release can also be granted in the case of a B rating" (replaced AB old rating) · Added requirements for Safe Launch activities ■ 5.11 · Added applicability of traceability in the entire automotive chain. · Added "Product specific traceability requirements" ■ 5.12 · Added additional specification regarding re-qualification of "product group" ■ 5.13 New chapter "Functional safety" ■ 5.14 New chapter "Quality requirements for development of embedded software"
6 | Methods of SUPPLIER escalation	■ 6.1 · Revised and updated with details "quality and logistics issues[...]" · Escalation level 2: updated mandatory requirement for audit. ■ 6.2 · Revised and re-written "ACL 1 requires an additional 100% inspection [...]" (instead of "test")
7 | Specific requirements for electronic components	■ 7.1 · Revised and re-written "HELLA Norm HN-67500" (instead of standard")
8 | Applicable documents, literature	■ Revised and updated according with changes ■ Added "Abbreviation list"

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