

Supplier Manual for production materials

First-class products demand first-class suppliers

Baumer Work Instruction 81232547, Edition 01 / December 2017



Baumer

Passion for Sensors

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1 Introduction

Meeting the future and ever-increasing demands of our customers in terms of quality and flexibility requires high-performance suppliers who are willing to tackle together with us the challenges to come. Only with partners which are capable and motivated to bring in all their product- and process-specific know-how for mutual benefit we will be in a position to achieve our ambitious quality objectives.

This manual was established as a guideline for the cooperation and partnership with our suppliers of production materials. Further it aims at providing the supplier with supplementary project-related information in addition to the BAUMER General Terms and Conditions of Purchasing No. 81072668 and other related purchasing contracts.

The requirements for ensuring and maintaining an impeccable product quality are described in this manual based on our procurement and quality policy as well as the relevant standards and manifold market and customer requirements.

2 Commercial conditions

2.1 Purchase orders and invoices

2.1.1 Purchase Orders

Purchase orders are generated out of BAUMER-ERP and come in written form. BAUMER strives for long-term supplier relationships and offers purchase order transmission in xml-format.

2.1.2 Invoices

Invoices must provide the BAUMER purchase order number, the BAUMER part number, quantity, net unit price and must comply with legal requirements.

Preferably, invoices should be emailed as pdf-file to the addresses below instead of sending paper documents.

BAUMER location	E-Mail address
Baumer Electric AG, Frauenfeld	invoice.bech@baumer.com
Baumer Electric AG, Kirchberg	invoice.bech@baumer.com
Baumer Hübner GmbH, Berlin	invoice.bude@baumer.com
Baumer Thalheim GmbH & Co. KG, Eschwege	invoice.btde@baumer.com
Baumer IVO GmbH & Co. KG, Villingen-Schwenningen	invoice.bide@baumer.com
Baumer Optronik GmbH, Radeberg	invoice.bode@baumer.com
Baumer GmbH, Stockach	t.b.d.

3 Tools and Measuring Equipment

3.1 Tools

3.1.1 Tool Management

Tool procurement for tool-specific parts comes under the contractual regulations agreed between BAUMER and the supplier. Unless otherwise stipulated the suppliers undertake to label the tools with the BAUMER part number and to store, manage, insure and maintain them properly.

Tools owned by BAUMER must be clearly marked as such according to the contractual arrangements.

3.1.2 Tool Design and Production

The supplier must use appropriate technical aids in design, manufacture and dimensional testing of tools, devices and measuring equipment. Where involving subcontractors, these are also mandatorily required to fulfill these prerequisites which come under the supplier's responsibility.

3.1.3 Tool Approval

Tool approval by BAUMER is made after successful completed Initial Sampling Process of the parts. Reference and retain samples out of the initial sampling process for tool approval remain at the suppliers and are to be managed by them.

Where not already defined in the Corporation Agreement, the retention period is to be agreed between the supplier and BAUMER.

3.1.4 Tool Administration

The supplier must use appropriate methods for tool administration under consideration of the criteria below:

- Tool life cycle,
- Appropriate storage system,
- Proof of preventive tool maintenance at regular intervals,
- The last part of a batch is to be stored until the next production run, where possible at the tool itself.

Tool change or replacement must be documented and communicated using BAUMER template 81137432 „Request for Modification Approval (REMA) / Request for OffSpec Approval (ROSA)“.

3.2 Measuring Equipment

3.2.1 Measuring Equipment Management

Testing and measuring equipment shall be included in the suppliers' test equipment management, shall be marked accordingly and must be traceable.

In customer projects, BAUMER has the right to demand proof of the measuring and test equipment capability.

Where required, test equipment capability must be proven according to 5.4.7.2.

Setup of product-specific test gauges and measurement fixtures must be coordinated with BAUMER.

The conception must consider both the entire periods of product development and production.

4 Terms of Delivery, Packaging and Delivery

4.1 Terms of Delivery

Unless otherwise stipulated in the contract, delivery terms are DAP or DDP according to the currently valid INCOTERMS®.

4.2 Packaging

4.2.1 Packaging in general

Unless otherwise stipulated by BAUMER, the supplier must ensure appropriate transport packaging to prevent the product from improper handling, damage or other quality impairments. The instructions under 4.3.2 and 4.3.3 are to be observed.

Product packaging and/or transport container marking must ensure clear identification and avoid any potential mix-up.

Where necessary, project-related Packaging Material and marking of Prototypes, pilot serial and serial parts come under separate agreement between the supplier and BAUMER.

4.2.2 Electronic Components

Electronic Components must be supplied in ESD-protective packaging. The manufacturer's specifications must be observed in accordance with the relevant specifications. All SMD devices must provide MSL (Moisture Sensitivity Level) in compliance with IPC / JEDEC J-STD-020 in the current valid version.

SMD components must only be delivered on coils (tape & reel). Any other type of SMD packaging is subject to prior agreement with BAUMER Purchasing.

4.2.3 Printed Circuit Boards (PCB)

PCB packaging come under the requirements specified in the BAUMER Delivery Conditions No. 81244901 "Technical Delivery Conditions Printed Circuit Boards".

4.3 Delivery and Goods receipt

4.3.1 General Information

BAUMER plant/ delivery address	Tel. Goods Receipt	Opening hours	
Baumer Electric AG Rampe Werk 3 Hummelstrasse 17 CH-8501 Frauenfeld	+41 52 728 16 40	Monday - Friday	07:00 – 12:00 13:30 – 16:00
Baumer Electric AG Industrie Neuhof 66 CH-3422 Kirchberg	+41 31 506 54 07	Monday – Thursday Friday	07:00 – 12:00 13:30 – 17:00 07:00 – 12:00 13:30 – 16:00
Baumer Hübner GmbH Max-Dohrn-Straße 2 D-10589 Berlin	+49 30 690030 178	Monday - Thursday Friday	07:00 – 14:00 07:00 – 12:00
Baumer Thalheim GmbH & Co. KG Hessenring 17 D-37269 Eschwege	+49 5651 9239 59	Monday - Thursday Friday	08:00 – 15:30 08:00 – 13:00
Baumer IVO GmbH & Co. KG Dauchinger Str. 58-62 D-78056 Villingen-Schwenningen	+49 7720 9420	Monday - Friday	08:00 – 15:30

BAUMER plant/ delivery address	Tel. Goods Receipt	Opening hours	
Baumer Optronic GmbH Badstraße 30 D-01454 Radeberg	+49 3528 4386 0	Monday – Friday	06:00 – 12:00 12:30 – 17:00
Baumer GmbH Bodenseeallee 7 D-78333 Stockach	t.b.d.	Monday – Friday	t.b.d.

The following information and details are also considered for the deliveries. Exception: goods sold by the meter or on reels.

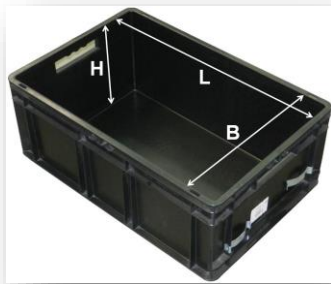
4.3.2 Parcels

Preferably, parcels should come in one-way packaging and where required use the BAUMER container system.

Blisters should not exceed the inside standard container dimensions, to eliminate the need for the product being unpacked and sorted into another container.

Observe the maximum parcel weight of **12 kg** which must not be exceeded.

The four BAUMER standard containers (dimensions below):



Size „EC“ (BAUMER part no. 11047463)		Size „EB“ (BAUMER part no. 11051939)	
Inside dimensions (L*W*H in mm)	258*158*114	Inside dimensions (L*W*H in mm)	358*258*114
Outside dimensions (L*W*H in mm)	300*200*120	Outside dimensions (L*W*H in mm)	400*300*120
Volume (l)	4.65	Volume (l)	10.53
Size „EO“ (BAUMER part no. 11047465)		Size „EG“ (BAUMER Part no. 11047468)	
Inside dimensions (L*W*H in mm)	358*258*166	Inside dimensions (L*W*H in mm)	558*358*216
Outside dimensions (L*W*H in mm)	400*300*170	Outside dimensions (L*W*H in mm)	600*400*220
Volume (l)	15.33	Volume (l)	43.15

4.3.3 Pallets

When not agreed otherwise, pallet-packed material must comply with the following:

- Use EUR pallets only,
- Do not stack EUR pallets (and neither any other) one above another,
- Permissible dimensions:

BAUMER location	Length*width*height (including pallet)
Baumer Electric AG, Frauenfeld	1200mm*800mm* 1700mm
Baumer Electric AG, Kirchberg	1200mm*800mm* 770mm

BAUMER location	Length*width*height (including pallet)
Baumer Hübner GmbH, Berlin	1200mm*800mm* 1000mm
Baumer Thalheim GmbH & Co. KG, Eschwege	1200mm*800mm* 1200mm Maximum permitted height with packaging material: 1800mm
Baumer IVO GmbH & Co. KG, Villingen-Schwenningen	1200mm*800mm* 1300mm Deliveries from China: Wooden one-way pallets, IPC standard compliant.
Baumer Optronic GmbH, Radeberg	1200mm*800mm* 2000mm
Baumer GmbH, Stockach	t.b.d.

4.3.4 Printed Circuit Boards (PCB)

PCB deliveries come under the requirements specified in the BAUMER Delivery Conditions No. 81244901 "Technical Delivery Conditions Printed Circuit Boards".

4.3.5 Goods receipt

Incoming goods are inspected at BAUMER for any obvious deviations only, under the criteria below:

- Material identification,
- Quantity,
- Visual inspection upon any damage, in particular caused by transport.

Where necessary an incoming inspection (check of characteristics/random samples) is carried out.

5 Quality

5.1 Quality Policy

We strive for long-term and partnership cooperation with our suppliers. Consistently high quality and reliability of competitive technology products can only be achieved by continuous improvement and updating of systems and processes, by speeding up throughput time and optimally harmonized test procedures. **Zero-defect performance** is our declared common goal.

Quickly changing and ever-increasing customer demands require both us and our suppliers to ensure maximum flexibility and commitment for quick and innovative solutions. The delivery and service performance of the supplier must therefore fully comply with the agreed requirements and, where applicable, legal provisions.

Zero-defect performance in the BAUMER quality strategy will only be achieved by appropriate and preventive quality planning and efficient process monitoring and control with focus on error elimination.

The supplier undertakes to supply defect-free products. These are our common goals:

- Long-term partnership,
- Common competitiveness,
- Optimal communication,
- Minimizing inventory and transport cost for mutual benefit,
- Quality assurance prior to Serial Production Ramp-Up,
- Continuous Quality Improvement, also in Serial Production,
- Reduction of Quality Costs.

5.2 Preconditions

Where not yet present, the supplier undertakes to establish a long-term oriented quality management system and to certify that at least the requirements of **DIN ISO EN 9001** in the current valid version are being fulfilled.

Distributors of electronic components need not be certified, but have to make sure their sub-suppliers/ manufacturers are correspondingly certified respectively certification is pending. Where required by BAUMER customers, a specific Quality Management System is to be agreed on a bilateral basis.

We all have to face the challenge of environmentally friendly production and environmentally compatible products. Mandatory to observe the applicable law and directives prevailing both at the supplier's and at the customer location the delivery is addressed to.

The supplier must ensure that all materials and raw materials of the production chain comply with the legal requirements for the reduction of risks relating to the use of SVHC (Substances of Very High Concern) as below:

- Switzerland: Chemicals Risk Reduction Ordinance, ORRChem 814.81
- Europe: REACH Regulation (EC) No. 1907/2006, POP Convention (EC) No. 850/2004, OzDS (EC) No. 2037/2000, incl. updates.

The supplier is obliged:

- to submit appropriate safety data sheets for such substances and preparations in accordance with Art. 31 of the REACH Regulation and Annex II
- to provide respective information on substances not requiring any safety data sheets as under Article 32 of the REACH Regulation
- to comply with the restrictions on the manufacture, market launch and use of substances as such, substances in preparations and substances in finished products as set out in Annex XVII to the REACH Regulation
- to comply in due course with the duty to communicate information on the presence of SVHC substances of the candidate list in a concentration above > 0.1% by mass (w/w) pursuant to Art. 33 of the REACH Regulation.

The environmental regulations prevailing in the country of origin and in the customer's country are to be complied with.

5.3 Quality Requirements

Product-specific quality requirements are defined in the drawings, specifications, applicable standards and additional documents listed in the purchase order. They define specifications for initial samples, delivery, particular quality requirements or additional customer standards for the mentioned material / part.

This is to make sure the supplier is well aware of the product-specific requirements both in the quotation phase and after order acceptance.

5.4 Quality Assurance prior to Serial Production

5.4.1 General Information

Timelines in development projects must be agreed on together with BAUMER under consideration of the customer requirements. The supplier is to make sure the required qualified manpower is present.

5.4.2 Important Terms

5.4.2.1 Product Specifications

Product specifications are a detailed list of the characteristics that identify an individual product.

5.4.2.2 Special Characteristics

"Special Characteristics" are **product characteristics** or **manufacturing process parameters** which can affect safety or compliance with regulations, fit, function, performance or subsequent processing of product.

„Special Characteristics" are always project-specific and defined by BAUMER (according to customer and/or legal requirements respectively safety or function). Any required proof of compliance to "Special Characteristics" in terms of definition, marking, documentation and monitoring methods is communicated to the supplier and must be provided.

Categories of „Special Characteristics“:

Category	Marking	Effect	Process Capability Requirements
Critical Characteristic	SC[CC]	Safety-relevant	$C_m/C_{mk}, P_p/P_{pk} \geq 2.0$ $C_p/C_{pk} \geq 1.67$
		Law-relevant	
Key Characteristic	SC[KC]	Function-relevant	$C_m/C_{mk}, P_p/P_{pk} \geq 1.67$ $C_p/C_{pk} \geq 1.33$
Minor Characteristic	SC[MC]	Process-relevant (in-house processing)	$C_m/C_{mk}, P_p/P_{pk} \geq 1.33$ $C_p/C_{pk} \geq 1.00$

If requested, „Special Characteristics“ require:

- verification upon Process Capability (see 5.4.7.1) or
- a 100% piece inspection (in small batches where proof of capability would not lead to the desired result),
- Measuring equipment validation (e.g. MSA) for evaluation of the used test equipment (see 5.4.7.2).

The supplier pledges to maintain a system for process monitoring and verification (SPC) for products with critical characteristics SC[CC]. Regular evaluation of the SPC records is required with starting Serial Production at the latest.

5.4.3 Contract Review and Feasibility Study

The supplier's proposal/quotation is considered as confirmation for having reviewed the contract and performed a Feasibility Study (at least under technical, organizational, economic and resource aspects) in order to ensure the performance required by BAUMER.

For the planning and implementation of strategic projects, the BAUMER template 81173959 "Feasibility Confirmation" is applicable. This form can be used by the supplier for proof of the Feasibility Study and is made available and requested by BAUMER if necessary.

The supplier declares and to confirm towards BAUMER that the template has been completed correctly and to the best of his knowledge.

5.4.4 Specifications / Drawings

Customer projects require the supplier to:

- Adhere to all legal provisions, specifications and standards in their current versions, as required by BAUMER,
- Evaluate, agree and comply with the BAUMER requirements (see 5.4.3),
- Evaluate, agree and comply with the BAUMER requirements on "Special Characteristics",
- Inform on any missing or false information (e.g. in specifications, standards),
- Notify the project-responsible purchaser of any non-compliance to relevant documentation.

5.4.5 Product and Process Risk Management (FMEA)

A Design FMEA may be demanded from the supplier where having development responsibility.

At the request of BAUMER, a Process FMEA (P-FMEA) must be completed prior to serial production and which must be updated with changes or complaints. P-FMEA must consider the relevant international standards (e.g. VDA Bd. 4 or AIAG FMEA - Potential Failure Mode and Effects Analysis 4th Edition).

The P-FMEA must include the „Special Characteristics“ defined by BAUMER using the agreed terms/abbreviations. The FMEAs must be made accessible to BAUMER on request.

The suppliers are requested to create Process FMEA's at their own initiative even if not explicitly requested by BAUMER.

5.4.6 Control Plan (CP)

The CP is based on the P-FMEA outcome and is an overview of the supplier's manufacturing process and product-specific quality requirements, test criteria and evaluation records. Where a product comprises several components (sub-components), the CP must include each level on to integration into the final product.

The CP must include the „Special Characteristics“ defined by BAUMER using the agreed terms/abbreviations.

BAUMER will request CP for pilot and serial production only if required by customer or necessary under project aspects. If so, the CPs must be presented to BAUMER and must be continuously updated in the event of any change or customer complaint.

If not agreed otherwise, the CP must provide the following information at least:

- Date of issue and change,
- Customer-specific information (customer number, component name, etc.),
- Name of manufacturer / supplier and the location/production site,
- Component number(s), part number resp. name,
- State of engineering change,
- Stage of production (prototype, pilot series / serial product),
- Primary contact of the supplier / manufacturer for any questions,
- Process Step and Process Name (also external processes performed by sub-suppliers),
- Product and process-related „Special Characteristics“
- Incoming and final and intermediate inspections,
- Testing and Measurement Methods,
- Action Plans, Corrective Actions and
- Product Audit.

5.4.7 Proof of Capabilities

5.4.7.1 Proof of Process Capability

Process Capability Studies must prove the required quality in the manufacturing process.

Evaluation and proof of Process Capability are only required if „Special Characteristics“ have been defined either by customer or BAUMER.

The supplier must provide the proof of Process Capability for the defined and identified „Special Characteristics“ on his own initiative.

If not required otherwise, proof of Process Capability must include the values defined under 5.4.2.2 and the following:

- Machine or short-term Capability c_m/c_{mk} : Minimum 30 parts one after another. The Proof of Machine Capability has to be presented with the initial sample documents (ISIR).
- Preliminary Process Capability p_p/p_{pk} : 25 random batches of 5 samples each = 125 parts. If possible, proof of preliminary Process Capability should be presented together with the initial sample documents. Otherwise the proof must be available once the data for the defined random batch quantity are present.
- Long-term Process Capability c_p/c_{pk} : Evaluation period minimum 20 production days. Long-term Process Capability must be evidenced as soon as feasible, however this implies evidence of both the Machine Capability and preliminary Process Capability.

The supplier is requested to prove long-term Process Capabilities in the running series unsolicitedly at regular intervals. Proof of Process Capabilities must be presented to BAUMER on request. Non-compliance to the above key metrics will entail a 100% inspection of the parts and documenting the results until Process Capability is achieved respectively restored. Any deviations from required specifications are to be agreed with BAUMER.

Suppliers are requested to carry out Process Capabilities Studies at their own initiative even if not explicitly requested by BAUMER.

5.4.7.2 Proof of Measuring and Test Equipment Capability (Measurement System Analysis)

The Measurement System Analysis is to prove the capability of Measuring Instruments and Measuring Systems.

Evaluation and proof of Test and Measuring Equipment Capability are only required where “Special Characteristics” have been defined either by the customer or BAUMER.

The supplier’s Measurement System Analysis for “Special Characteristics” shall be carried out on the basis of the ISO Standard or other officially recognized procedures.

The Measurement System Analysis according to ISO Standard should include at least:

Method	Description
1 (C_g and C_{gk})	Proof of accuracy and repeatability of the Measuring Device No operator influence. A calibrated master part (also standard) is measured 25 times at least. $C_g/C_{gk} > 1.33$
2 (<i>Gauge R&R study</i> - %GRR)	Measuring Device must be capable of method 1. With operator influence. 10 parts, the dimensions of which need not be known, are measured at least twice in random order by 3 different operators. %GRR ≤ 10% - capable 10% < %GRR < 30% - capable with limitations %GRR ≥ 30% - not capable
3 (<i>R&R study</i> - %GRR)	Particular case in method 2. Measuring Device must be capable of method 1. No operator influence. Analysis shall use at least 25 random parts from serial production, the dimensions of which need not be known. The parts are measured at least twice in random order. %GRR ≤ 10% - capable 10% < %GRR < 30% - capable with limitations %GRR ≥ 30% - not capable

Any non-conformity to specifications must be agreed with BAUMER.

Suppliers are requested to perform Measurement System Analyses at their own initiative even if not explicitly requested by BAUMER.

5.4.8 Samples of mechanical components and PCBs

5.4.8.1 Prototypes and Pre-Production Parts

Prototypes and Pre-Production Parts are functional samples that comply with the BAUMER specifications. They are usually not yet produced under serial manufacturing conditions but in the manufacture the supplier may have used all available manufacturing tools and resources in compliance to preliminary specifications.

Prototypes and Pre-Production Parts, together with the related documentation, are requested by BAUMER and must provide the BAUMER purchase order number which must be clearly indicated

in delivery. The project-responsible purchaser at BAUMER is the contact for any questions on documentation and date of sampling of prototypes and pre-production parts.

5.4.8.2 Initial Sampling

BAUMER is geared to international standards in the event of Initial Sampling for serial production approval.

Initial Samples are produced in compliance to the agreed specifications and conditions of serial production and, where being tool-specific, use the tools and utilities applied in serial production.

Initial samples prove also compliance to the test requirements defined by BAUMER.

If requested by BAUMER, the materials used must be listed in a material data sheet or a material test report according to EN 10204.

The submission level (scope of sampling) is defined by BAUMER under project-relevant aspects. The supplier is informed accordingly.

5.4.8.3 Initial Sample Purchase Order

Initial Samples require a BAUMER Purchase Order. If not agreed otherwise, the number of initial samples to be measured completely is 5 pieces.

Unless agreed otherwise, parts using identical tools, or parts molded in a number of molds or cavities, require five parts by each tool, mold or cavity to be measured and individually shown in the sample documentation.

Since the final purchase order may allow deviations from standardized submission levels, the supplier is provided with the report template 81131619 „Initial Sample Inspection Report“ with the requested specific scope of the Initial Sampling. At least the cover sheet must be applied.

5.4.8.4 Initial Samples Inspection Report (ISIR)

ISIR must be attached to the delivery documents of the Initial Sample Delivery.

All parameters and dimensions required by BAUMER and agreed jointly upon must be entered in the ISIR by the supplier as target dimensions including tolerances and as actual values.

The relevant characteristics must be clearly marked in the documentation (drawings, specifications) with cross-reference to the ISIR results. Attached copies must be clearly legible in font and contrast.

The completed ISIR and any other inspection-relevant documentation (drawings, specifications, etc.) must be e-mailed in advance to the address given in the purchase order. The documentation must be attached to the delivery additionally. Below is a list of the relevant e-mail addresses.

BAUMER location	E-mail address
Baumer Electric AG, Frauenfeld	imi.bech@baumer.com
Baumer Electric AG, Kirchberg	shipping.kirchberg@baumer.com
Baumer Hübner GmbH, Berlin	imi.bude@baumer.com
Baumer Thalheim GmbH & Co. KG, Eschwege	imi.btde@baumer.com
Baumer IVO GmbH & Co. KG, Villingen-Schwenningen	imi.bide@baumer.com
Baumer Optronic GmbH, Radeberg	imi.bode@baumer.com
Baumer XXX GmbH, Stockach	t.b.d.

Initial samples must be entirely compliant to the agreed specifications. Any deviation is not permitted.

Note: If agreed with BAUMER early on, in exceptional cases a written approval may be given for deviations regarding quantity or timeline before Initial Sampling.

Such Special Release must be timely requested by the supplier with the template 81137432 "Request for Modification Approval (REMA) / Request for OffSpec Approval (ROSA)".

The extents of re-sampling are agreed by BAUMER with the suppliers.

5.4.8.5 Initial Sample Delivery

Initial Samples must be delivered with a corresponding remark on the delivery note (e.g. „Important! Initial Sample Delivery“). Packaging must be marked „Initial Samples“.

Already inspected Initial Samples must be kept separately from other Initial Samples in the delivery and must be clearly marked (e.g. red sticker) and numbered. The inspected Initial Samples must ensure clear allocation of the measured results.

Where required, any marking details may be agreed with the project-purchaser of BAUMER.

Initial Samples included in a standard material delivery must be packed separately.

5.4.8.6 Decisions in the Initial Sampling Process

After the Initial Sample Inspection by BAUMER, suppliers and the relevant in-house staff will be informed about the decision made. The following decisions are possible:

- Approved:

The Initial Samples are compliant to the specifications and requirements and the documentation is complete. The approval entitles the supplier to deliver production quantities of the sampled part according to BAUMER's orders.

Initial Sample Approval does not automatically mean an assignment for serial delivery. This is done only by a separate purchase order from BAUMER.

- Approved with conditions – Re-Sampling required:

The documentation is insufficient or a reason for refusal is existing for the production batch from which the Initial Samples were taken, but the parts are accepted for a limited period of time or at limited quantities with the proviso of a problem-free further processing.

- Rejected – Re-Sampling required:

A reason for refusal exists for the production batch from which the Initial Samples were taken and a problem-free further processing is impossible.

Re-Sampling means that amended products and / or a revised documentation have to be sampled again. Another BAUMER inspection and approval process is required prior the parts are approved for serial deliveries without limitations.

The required Corrective Actions in the re-sampling process must be agreed between the supplier and BAUMER.

Important: If Initial Samples are rejected, the supplier will bear the costs for reworking or replacement of utilities/tools which are in his responsibility and will be used in later serial production.

5.5 Quality Assurance in the Serial Production

5.5.1 Key Metrics and Objectives

BAUMER strives for zero-error quality and expects the same commitment from its suppliers. Individual PPM target values are defined if necessary.

BAUMER is aware of the quality and logistics key metrics in the supplier's performance and keeps the supplier informed.

A continuing unsatisfactory delivery performance will be escalated at the levels specified in 0. Once a year the suppliers undergo a detailed supplier evaluation (see 6.2).

5.5.2 Special Release

The stipulated serial product specifications are mandatory to observe, any deviations are not permitted.

Exception: In individual cases and after consultation with BAUMER, temporary or quantitative limited releases may be granted with the written consent by Purchasing, R&D and Quality Management of BAUMER.

Special Releases must be requested by using the template 81137432 "Request for Modification Approval (REMA) / Request for OffSpec Approval (ROSA)".

The completed template has to be sent by email to the appropriate address as under 5.4.8.4 respectively to the contact at BAUMER Purchasing.

5.5.3 Complaint Process

In the event of a claim or complaint, BAUMER informs the supplier in a complaint report. The suppliers are requested to initiate Immediate Actions, analyze the deviations as well as implement Corrective Actions and monitor the implementation.

Complaints require 8D reports which must be presented to BAUMER in written form within the periods below, if not agreed otherwise:

- **D1 – D3 within 48 h**
- **D4 – D8 within 10 working days**

Where no individual supplier 8D-Template is present, the BAUMER template 81140845 "8D Report" has to be used.

Where analyzing the facts is supposed to take more time, or should urgency demand an immediate supplier statement, the responsible claim coordinator at BAUMER must be notified.

Where the Non-Compliance is more complex, a common analysis will be aspired on site.

5.5.4 Escalation

Suppliers who do not meet the BAUMER requirements of supply quality may undergo four-level internal escalation at BAUMER:

Level	Action
1	<ul style="list-style-type: none">- Supplier's 8D-process- Unsatisfactory quality of the 8D report may escalate at level 2
2	<ul style="list-style-type: none">- The supplier's quality management is notified in written and required to present an action plan to eliminate the cause for escalation.- Where required, SQM resp. QM will perform an on-site performance audit to verify the supplier's action plan.- Additionally, the supplier may be invited to Baumer to agree on an action plan; respectively Baumer may visit the supplier or perform an audit.
3	<ul style="list-style-type: none">- Notification of the Supplier's Quality Manager and Managing Director.- The responsible purchaser at BAUMER invites the supplier to a meeting to agree on an action plan and to eliminate the cause for escalation.- Audit or visit to supplier.- Verification of action plan in a performance or process audit by SQM respectively QM at the supplier's.- Supplier may be blocked for future transactions.
4	<ul style="list-style-type: none">- Actions as described under 3.- Supplier may be blocked for any future transactions.

BAUMER reserves the right to skip one or more levels in the event of short-term and unexpected severe issues.

5.5.5 Changes at mechanical components and PCBs after Serial Production Approval

After successful Initial Sampling respectively Serial Production Approval (see 5.4.8) changes are notifiable. BAUMER has to be informed before:

- Changes made at the product or particularly agreed product packaging,
- Change in production methods, facilities, processes and materials (also at sub-supplier level),
- Change at serial tools for tool-specific parts respectively tool replacement,
- Changing the sub-supplier(s),
- Production relocation or new setup at another location,
- Setup of new installations at which BAUMER products will be manufactured.

Any change requires the prior written consent of BAUMER using template 81137432 "Request for Modification Approval (REMA) / Request for OffSpec Approval (ROSA)".

Once BAUMER has approved the change, the supplier is requested to present the proofs of quality determined by BAUMER (see also chapter 5.4.8).

Where necessary, changes after Serial Production Approval will be additionally regulated by means of the PPCNA (Product & Process Change Notification Agreement).

5.5.6 Product Life Cycle Management for electronic components

Product Change Notifications (PCN) or Product Discontinuation Notifications (PDN) must be emailed to pcn_pdn@baumer.com.

Regarding the deadlines the JEDEC requirements apply.

Any deviation to the above determined procedure requires the prior agreement of BAUMER Purchasing.

5.6 Documentation and Archiving

Product-relevant documentation which contains statements on the manufacturing process or on the quality of a specific individual part of BAUMER must be archived by the supplier. The supplier is also required to document and archive proofs of capability and test results related to "Special Characteristics" and to present them to BAUMER on request.

Where not already defined in the Corporation Agreement, the retention period is to be agreed between the supplier and BAUMER.

Documents and records must be archived and disposed of in such a way that they are not accessible to third parties.

5.7 Traceability

5.7.1 General Traceability

The supplier maintains a traceability system to ensure material traceability from goods issue on to the semi-finished product and – where required by BAUMER - traceability down to sub-supplier level.

5.7.2 Traceability and Marking of Electronic Components

Baumer shall only accept OEM products from authorized suppliers / distributors. To ensure traceability, the original label (manufacturer's label) on electronic components must not be modified or covered by another label.

Every packaging unit must provide the original label and the supplier's label.

The manufacturer's label (original label) must include at least:

- Manufacturer's name,
- Manufacturer's material number,
- Number of packaging units,
- Batch number,
- Production date,
- Country of origin,
- Manufacturer's barcode, 2D DataMatrix code.

The supplier's label must include at least:

- Baumer Purchase Order No.
- Baumer Material No.

The information on the supplier's label must also come on the delivery note.

5.8 Visit and Audit at the supplier's

BAUMER reserves the right to visit or audit the supplier's production site, as well as those of his sub-contractors, at any time after prior notice within the official business hours and, if required, attended by the related BAUMER customer. Such visits or audits will be announced early on to ensure appropriate time for preparation.

5.9 Continuous Improvement, CIP

Continuous improvement must be integral part of the supplier's quality strategy.

BAUMER expects the supplier's active cooperation for continuous process and product improvements. Where required, BAUMER will support the supplier in CIP projects.

6 Closing information

6.1 Selection of suppliers

The BAUMER motto in supplier selection is: Product and delivery performance at a competitive price.

6.1.1 Self-Information of supplier (Supplier Information Sheet SIS)

The supplier's self-information is the main information content for the first overall supplier evaluation. The Template 81072297 „Supplier Information Sheet «SIS»“ comes together with the NDA in the first approach prior to an inquiry. Both signed NDA and completed SIS are to be returned to the inquiring purchaser.

The supplier must inform BAUMER immediately in written form in the event of any change made to the SIS after having returned the template.

6.1.2 Visit and Audit at the supplier's

BAUMER reserves the right to visit or audit the supplier as part of the approval process. The supplier is requested to support BAUMER as much as possible. An audit may be necessary in the event of:

- Lacking ISO certification
- Evaluation of new suppliers of components subject to special requirements
- Request of the joint customer

The supplier obliges to eliminate the findings listed in the audit report within the agreed deadlines.

6.1.3 Supplier Approval

Business is based on the General Terms and Conditions of Purchasing and the concluded agreements.

Upon completion of the BAUMER approval procedure, the suppliers are listed as released.

A supplier may be blocked completely or in part for the following reasons:

- Considerable drops in the quality performance,
- Repeated, unsatisfactory results in supplier evaluation,
- Unsatisfactory performance in the implementation of Corrective Actions,
- Insufficient reaction and cooperation.

See also chapter 0.

6.2 Supplier Evaluation (ASE)

6.2.1 Criteria of the Annual Supplier Evaluation

Once a year, BAUMER determines the key metrics in supplier performance in terms of logistics, procurement, production and quality management. By means of these key metrics are determined suppliers whose overall performance level is rated by a total score.

The evaluation is sent annually in written form to the selected suppliers by Strategic Purchasing and comprises the following criteria and weightings:

Main criteria	Weighting	Sub criteria	Weighting
Quality*	60%	Claim rate*	40%
		Supply quality*	60%
OTD*	40%	OTD supply*	70%
		OTD oc*	30%

*Legend:

- Quality: Quality (Quality Performance)
 - OTD: On Time Delivery (Delivery performance within time frame -5/0 days)
 - Claim rate: Percentage of non-claims in supplies within the period under review
 - Supply quality: Percentage of non-claims in quantities supplied within the period under review
 - OTD supply: Percentage of on-time supplies within the period under review
 - OTD oc: Percentage of on-time-supplies without reminder within the period under review
- All percentages are rounded to integer numbers.

Calculation formula:

$$\text{Overall evaluation} = (((\text{Claim rate} * 0.4) + (\text{Supply quality} * 0.6)) * 0.6) + (((\text{OTD supply} * 0.7) + (\text{OTD oc} * 0.3)) * 0.4)$$

The overall evaluation is rounded to an integer number.

6.2.2 Classifications in the Annual Supplier Evaluation

The result of the supplier evaluation is evaluated as follows:

Outcome	Evaluation
≥ 98%	Requirements fulfilled
< 98%	Requirements adequately fulfilled
≥ 95%	
< 95%	Requirements inadequately fulfilled

Suppliers who do not fully meet the BAUMER requirements are invited to submit an ASEIP (Annual Supply Evaluation Improvement Plan) to improve their performance.

Trigger threshold for initiating improvement actions by an action plan (ASEIP) is the overall evaluation and / or <95% performance in one of the partial evaluations.

The template 81246548 "ASEIP-Annual-Supply-Evaluation-Improvement-Plan" is provided by BAUMER.

The supplier is requested to return the completed ASEIP template (actions / measures, names responsible for implementation at the supplier's, target status and deadlines) to the responsible strategic purchaser at BAUMER.

The returned ASEIP is approved in cooperation with the supplier. The implementation of the defined Corrective Actions in due time comes under the responsibility of the supplier.

7 Abbreviations

- AIAG - Automotive Industry Action Group
- APQP - Advanced Product Quality Planning
- ASE - Annual Supplier Evaluation
- CIP - Continuous Improvement Process
- ISIR - Initial Sample Approval Report
- FMEA - Failure Mode and Effects Analysis
- IPC - Institute for Printed Circuits (now: Association Connecting Electronics Industries)
- ISIR - Initial Sample Inspection Report
- JEDEC - Joint Electron Device Engineering Council (now: Solid State Technology Association)
- MSA - Measurement System Analysis
- NDA - Nondisclosure Agreement
- OEM - Original Equipment Manufacturer
- OTD - On Time Delivery
- PCN - Product Change Notification
- PDN - Product Discontinuation Notification
- PPM - Part Per Million ($1\text{ppm} = 1 \cdot 10^{-6} = 0.000'001$)
- QM - Quality Manager
- SMD - Surface-Mount Device
- SPC - Statistical Process Control
- SQM - Supplier Quality Manager
- VDA - Association of the German Automotive Industry

8 Documents and Templates

8.1 Documents

BAUMER provides respectively applies the documents listed below:

- 81072668 General Terms and Conditions of Purchasing
- 81244901 Technical Delivery Specification Printed Circuit Boards
- 81246548 ASEIP-Annual-Supply-Evaluation-Improvement-Plan

8.2 Templates

The templates below are available at www.baumer.com/procurement.

- 81131619 Template „Initial Sample Inspection Report“
- 81140845 Template „8D Report“
- 81072297 Template „Supplier Information Sheet «SIS»“
- 81173959 Template “Feasibility Confirmation”
- 81137432 Template “Request for Modification Approval (REMA) / Request for OffSpec Approval (ROSA)”

9 Contact

In the event of any queries, please contact the responsible purchaser at the respective BAUMER site. In case of an unsolicited applications email your questions and documents to procurement@baumer.com.

10 Change History

Version	Date	Modified by	Approved by	Reason for Change	Change
1	20171209	spal	mew	Initialversion	New Document
2	20180531	su	w eu	Material compliance specifications	Modification Chapter 5.2: Specifications Material Compliance listed