ASMPT enabling the digital world

Technical Conditions for Orders and Deliveries

Quality Requirements **Edition 11/2023**

Preface

Outstanding quality as a commitment to maximized customer value

The present Technical Conditions for Orders and Deliveries (TCOD) describe the general quality requirements placed by ASMPT SMT Solutions, referred to as “ASMPT” in the following, on products and processes provided by its suppliers and subcontractors.

ASMPT is a leading provider in all important segments of the electronics manufacturing industry. With our SIPLACE placement machines, we are setting the standards for SMT process automation across the globe.

Success in a hard-fought market can only be achieved with products that fully meet our customers' expectations with respect to innovation, performance, quality and price.

This ambition can only be achieved by integrating high-performance and quality-focused suppliers as partners into the overall concept.

Our suppliers work with us to drive quality, technology, logistics and productivity. This is the background against which we continuously improve our processes, services and structures in order to satisfy the requirements of a highly innovative and dynamic marketplace.

In these TCOD, the term “supplier” designates the contractors of ASMPT. Contractors of suppliers to ASMPT are referred to as “subcontractors”.

The requirements defined in the TCOD apply to suppliers and are based on the expectation that the latter will work with us in a spirit of partnership to contribute to our common goal of providing outstanding quality for maximum customer value at competitive prices.

Contents

1. Scope

The Technical Conditions for Orders and Deliveries (TCOD) apply to all products supplied to ASMPT. They constitute minimum requirements, which are complemented by product-specific and process specific specifications as required.

Products comprise all assemblies, parts, systems and services that are delivered by a supplier

The procedures and definitions described below represent the ASMPT standard. ASMPT expects its suppliers to implement comparable procedures in their own processes in order to ensure the quality of their product and service provision.

The supplier is fundamentally responsible for the quality of the supplied products. This applies to the entire scope of delivery.

When a supplier acts as a general contractor, ASMPT expects it to enter into binding agreements with its own suppliers regarding the quality requirements defined in these TCOD If requested by ASMPT, the supplier is required to identify any subcontractors involved.

It is assumed that the supplier possesses suitable expertise to verify that "third-party" technologies meet the quality requirements.

The present TCOD replace and supersede all previous editions. They will remain in effect until revoked or replaced with a new edition.

These TCOD complement the ASMPT General Terms and Conditions of Business. The Ordering Conditions will also be agreed. The requirements set out in the Ordering Conditions take precedence over the requirements defined in the TCOD.

2. Point of contact

The central point of contact for all supplier information and queries is the Purchasing department of ASMPT. The Purchasing Department will designate a specific contact person for suppliers.

Binding contracts and orders will acquire legal effect only if agreed with the strategic or operative Purchasing / Planning & Scheduling department of ASMPT.

Suppliers must designate (and inform ASMPT of) a central contact person responsible for the supply relationship.

3. Quality Management / Environmental Management

3.1. Quality Management

ASMPT requires its suppliers to have introduced a process-oriented quality management system as set out in ISO 9001 or IATF 16949 and to adhere to this at all times.

3.2. Environmental Management System

ASMPT is committed to the protection of the environment.

We therefore expect our suppliers to adhere to and implement in practice the requirements with respect to environmental management set out in ISO 14001 or similar national regulations during their operations.

3.3. Quality objectives

The supply contract obliges the supplier to supply products ordered by ASMPT free from defects.

The supplier must take preventive measures and make use of suitable analytical methods (e.g. FMEA, FTA, QFD, review methods) and suitable tests during its processes to ensure that all defined quality requirements are fully complied with.

The supplier must establish the CIP philosophy (**C**ontinuous **I**mprovement **P**rocess) in its company and ensure that it is actively applied in every area of corporate activity.

All suppliers to ASMPT are subject to the quality objective of:

“Zero defects”

The suitability of function-critical processes used in series production by the supplier must be monitored by means of scorecard systems and/or statistical process control approaches.

The following target values apply: C_P / $C_{PK} \geq 1.33$

Product-related quality objectives that exceed this target are defined in the product specifications.

4. Selection, approval and release of suppliers

At ASMPT, supplier selection is based on the criteria of quality, technology, logistics, price and productivity as well as the ESG criteria (Environment, Social, Governance).

Regarding the ESG criteria, the ASMPT Code of Conduct is a requirement for entering into a business relationship. In addition, suppliers are obliged to comply with the requirements set out in the Supply Chain due diligence Act and to pass these on to their suppliers. ASMPT Code of Conduct

During the selection process, suppliers must prove that they are able to supply products that meet all the requirements of the ASMPT specifications, drawings and other contractual conditions.

ASMPT will usually evaluate a supplier’s capability to provide quality prior to the start of a supplier relationship. The method used to determine this capability can be a combination of supplier self-declaration, bilateral negotiations, a process audit (analysis of potential) and the evaluations of sample orders.

If the above criteria are fulfilled then this will usually result in the placement of an order including the inspection of an initial sample.

Successful initial sample inspection and proof of the stable quality of series production will usually result in the release (acceptance) of the supplier.

5. Order Processing / Change Management

5.1. Inquiries and orders

The central point of contact for all supplier information and queries is the Purchasing department of ASMPT.

Inquiries and orders are sent exclusively via the Strategic Purchasing or the Operative Purchasing / Planning & Scheduling departments.

ASMPT is not obliged to accept any service provided prior to the conclusion of a contract.

In the event of an inquiry, the supplier shall verify the documents accompanying the inquiry with respect to plausibility, completeness and feasibility (technical specifications and deadlines). The documents provided to the supplier must be examined with respect to the listed and other applicable guidelines, standards and legal provisions and any discrepancies must be discussed with ASMPT. The contents of the verification must be confirmed to ASMPT by means of an offer.

On placement of the order, the supplier must compare the inquiry and order. If the contents correspond to one another, an order confirmation is sufficient. If the contents differ then the entire contract verification process must be performed again, and only after this can the order confirmation be sent to ASMPT. In all cases, order confirmation confirms the feasibility and acceptance of all contractual and technical requirements by the supplier.

If any discrepancies or changes occur or possible delays are identified, the supplier shall immediately inform ASMPT in writing and introduce the necessary measures.

To ensure the flow of information concerning possible disruptive factors, the supplier must maintain a documented escalation management system.

- An escalation process must be in place to handle deviations in projects that affect the overall schedule (risk management)
- Project risks must be identified, assessed, mitigated by means of appropriate measures and monitored over the entire development process.
- The escalation criteria must be defined, responsibilities and authorities must be regulated and measures must be identified in the event of deviations
- If specific risks are identified for technologies, suppliers or countries, these must also be covered by escalation management.

5.2. Basis for orders

Orders issued by ASMPT are generally based on released documents. These documents are part of the order and are enclosed in full at least with every initial order.

In all cases, the supplier must check the provided technical documents to ensure that they are complete and up-to-date.

The current versions of all general documents and forms are available for download on the website (see Section 11.1 Download of forms and other documents). Before accepting any order, the supplier is obliged to check the status of their documents and to update them if necessary. The requirements defined in concluded contracts and quality assurance agreements take precedence over the requirements set out in the present Technical Conditions of Orders and Deliveries.

In case of contradicting information, the technical drawing always has priority over CAD models of the same revision status. Values specified on the drawing have priority over the values in referenced specifications. Any deviation from these rules must be agreed in written form.

5.3. Inquiries to subcontractors

Inquiries to subcontractors must at least include the following information:

- Technical description of the product or description of the service
- Basic framework conditions and information on the application or use of the requested product or service
- Other applicable standards and guidelines
- Specifications and datasheets, information about the manufacturer if required

When processing inquiries, the requirements from this TCOD must be taken into account.

Before data from ASMPT is passed on to third parties, a confidentiality agreement must be signed with them and a commitment to the ASMPT quality goals (target agreement) must be obtained.

5.4. Product or process changes

All changes (triggered by suppliers, internally, or customer) must be evaluated by the supplier and the project plan must be adapted if necessary. This assessment must include the risk assessment for product quality as well as compliance with deadlines. Sub-suppliers must be actively involved in the change management process for critical scopes.

ASMPT must be informed in writing of any effects on quality, price, or delivery time. All deviations from the original planning must be approved by ASMPT.

All changes must be documented in a parts history.

5.4.1. Design or product changes on the part of ASMPT

ASMPT may only bring about technical changes for series parts/components with the supplier on the basis of written change notices. The scope of the change and the interface at which it takes effect must be unambiguously defined. At ASMPT, this is done by transmitting the change notification via Purchasing or Scheduling.

5.4.2. Product or process changes brought about by the supplier

The designs, dependability requirements and manufacturing processes agreed and defined in the order documentation may not be changed without the written approval of ASMPT Failure to comply with this provision could result in serious and expensive consequences for the finished product.

If changes that have an impact on form and appearance, interchangeability or functionality and attributes are unavoidable, then the supplier must notify the purchasing and quality assurance departments for supplied parts at ASMPT of the desired changes.

The supplier must document the changes comprehensively and in detail and subject them to verification as appropriate for the changes in question. In such cases, the supplier shall verify all requirements relating to functionality, compatibility, and interchangeability with existing products

Suppliers must maintain an appropriate version management system for their products and document all changes in detail (part history).

5.4.3. Product discontinuation / product cessation by the supplier

If the supplier intends to discontinue the production and delivery of the released product, then Strategic Purchasing (ASMPT GP) must be informed of this in good time.

To this end, the supplier must provide the following information to Strategic Purchasing at the latest six months prior to the discontinuation of production:

- ASMPT material number of the discontinued component and the module for which it is planned
- The residual amount that can still be delivered
- Last delivery deadline or deadline for “Last Call”
- Possibilities for substitute coverage/alternatives
- Suggestions for substitutes including assessment of the risks if an alternative product is used

The supplier undertakes to deliver the amount ordered for residual coverage in such a way that this will withstand an agreed storage period without detrimentally affecting the product’s attributes and its processing properties. The buyer must be informed of the corresponding storage conditions (e.g., climatic conditions).

5.5. Production accessories and tool management

The conditions will be defined contractually when tools are ordered.

The term “production accessory” includes all supporting equipment provided by ASMPT such as measuring devices, sorting machines, counterparts and gages, samples and similar items. In this section, “tools” are understood to comprise all means of production that are specifically manufactured on the basis of drawings and only serve this one purpose. Typical tools are injection molding tools, specific clamping devices, casting models, etc.

Corresponding lists must be kept of the inventory of tools with records of frequency of use, operating time, the number of parts produced, maintenance and repairs. This list must be forwarded to the responsible Commodity Manager annually.

Even though not the owner of the tools, the supplier undertakes to treat ASMPT-specific production accessories carefully, to store and maintain them protected from environmental influences. Corresponding emergency plans must be drawn up in order to provide protection in the event of disasters such as fire or flooding

During the annual requalification process, it is necessary to perform a dimensional inspection in order to determine continued suitability. The supplier is also obliged to inform the ASMPT Purchasing department if a new tool procurement operation is required in the near future.

Tools that are the property of ASMPT must carry labeling indicating this fact:

Property of:	ASMPT SMT Solutions
Inventory No.:	[Information from ASMPT Purchasing]
Drawing No:	[Number as shown on order including production status]
Designation:	[Name of the component, other information]

The ASMPT Purchasing Department can provide support with such labels, indicate the corresponding suppliers and provide layouts.

6. Technical documentation

6.1. Bill of materials as master document

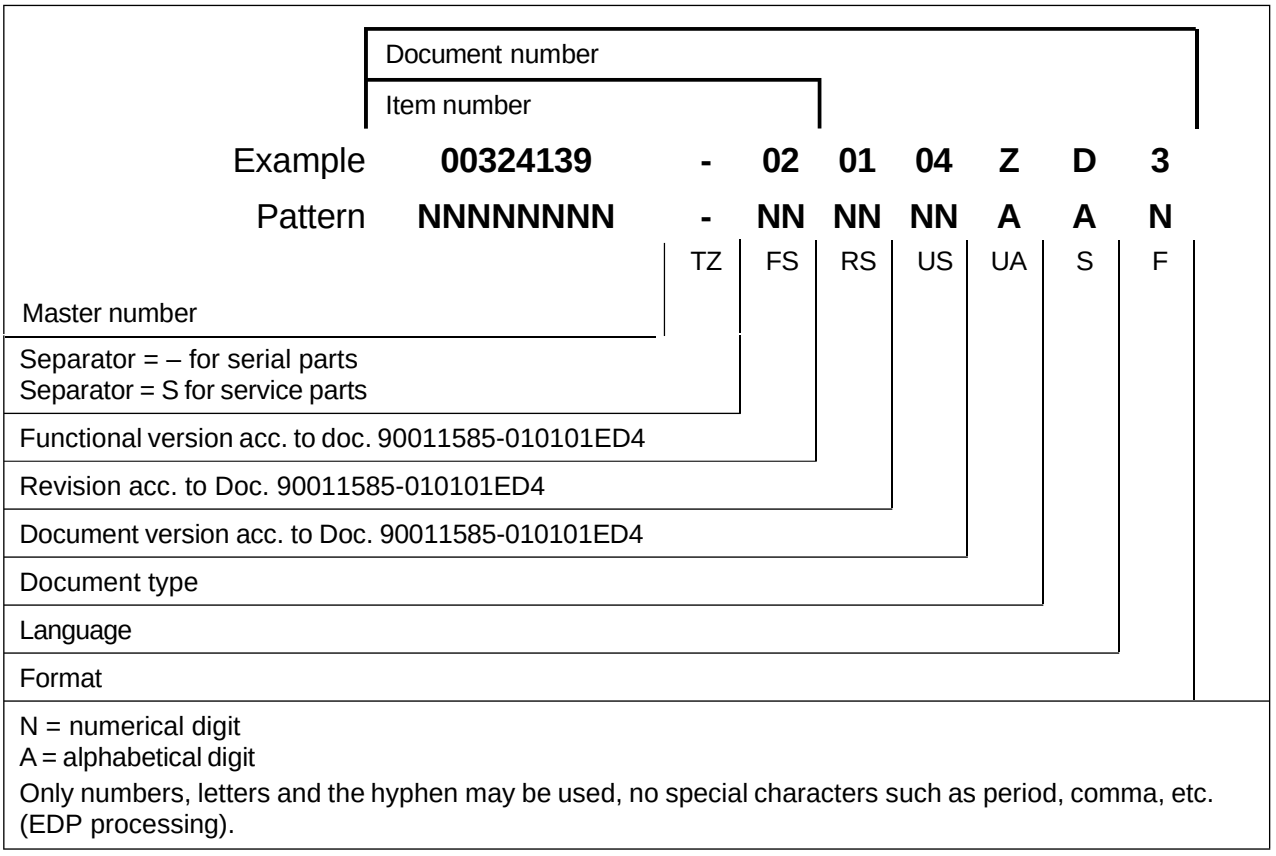
The bill of materials, which is to be considered the master document, serves as the basis for all corresponding sub-assemblies, individual parts and specific documents defining the ordered product. The supplier shall verify against this bill of materials whether all documents relevant for the execution of the order are available in their current version.

Missing or newer versions of documents from ASMPT can be requested from Purchasing. General standards can be obtained from an appropriate standards body.

If no version or no issue status is defined in the bill of materials, the actual status always applies. The supplier must maintain a corresponding system that always guarantees that standards are available in their most recent versions.

6.2. Technical numbering system

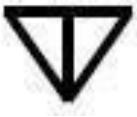
The identification of ASMPT products is described below. Any change of a master number (= item number), functional version (FS) or revision (RS) can affect the manufacturing of products. All employees who are involved in the manufacture of parts, assemblies and systems to be supplied to ASMPT must be familiar with the numbering system.



6.3. Test symbols used in technical documentation

In the ASMPT technical documentation, individual product attributes are identified by symbols. Their assignment is shown in the table below. This may not be applicable for drawings according to ISO GPS 8015.

Identification / symbol	Attributes	Definition of attribute
	Safety-relevant attribute	An attribute that is critical for the safety of ASMPT products. The supplier must provide the evidence laid down in the test instructions that the specified attributes have been met. In the event that no test instructions are available, the type and scope of testing must be agreed in writing with the customer. The products must display the required attributes 100%. The supplier must perform a process FMEA for the safety-

		related attributes and, if $C_P/C_{PK} \geq 1.3$, a 100% verification must be planned (see **Fehler! Verweisquelle konnte nicht gefunden werden.**).
	Critical attribute (test category I)	An attribute that is critical for the functionality of a part and is of special importance for quality, reliability or durability. For series production, the supplier must provide evidence of the required process capability for such attributes by means of product capability analyses (**Fehler! Verweisquelle konnte nicht gefunden werden.**). Goal: Cp/Cpk ≥ 1.33 (For underlying principles, see IPC-9191 and the underlying references)
	Primary attribute (test category II)	An attribute that is not critical for the functionality but whose absence would significantly affect the expected performance of a product, reduce customer satisfaction, or impair productivity. Such attributes must be validated by means of attribute testing (OK / NOK test). (Sampling in accordance with DIN ISO 2859 Part 1)
Without identification	Secondary attribute (test category III)	Other attributes not classified as a critical or primary attribute. These attributes are validated at the supplier's discretion.

7. Process requirements

7.1. Project management

7.1.1. Project planning

During project planning, our suppliers accept responsibility for their entire supply chain, starting at the interface to ASMPT right down to their own suppliers and beyond if necessary.

The supplier must subdivide projects into sections and plan them with a defined scope and milestones. Resource usage appropriate to requirements must be ensured.

The progress of the project must be checked in a traceable way at regular intervals and reports must be sent to ASMPT upon request.

The project plan reflects all internal and customer milestones. Regular assessments (reviews) are carried out for the defined milestones to check that all planned activities have been performed and the required level of maturity has been reached. If it is necessary for a specific product, the duration of the legal or development-related approval process must be mapped in the project planning.

If the project plan changes, internal communications and communication with the sub-suppliers must be ensured. Changes to the project plan that affect the customer are coordinated with and approved by the customer.

Detailed, quality-relevant activities in the project must be part of the project plan. Separate documents (QM plan) can also be referenced from the project plan.

Detailed activities relating to the project's procurement scopes must also be included in the project plan. The project plan can also refer to separate detailed plans.

7.1.2. Quality planning in projects

In addition to the planning of the individual project steps and the corresponding milestones, the systematic procedures and methodology employed to prevent errors and ensure quality must be defined at the start of the project.

Quality measures such as FMEA, FTA, design reviews, tolerance calculations etc. must be used by the supplier to assess the risks of the project/product. The defined quality measures must be specified in a control plan.

The control plan must be reviewed at regular intervals in line with the progress of the project. The results of the individual measures must be recorded in writing and are part of the project documentation.

The product-related requirements, statutory regulations and standards, including those related to product safety and environmental protection, must be incorporated in the control plan and must be documented in a traceable way.

In the case of subcontracted development work, the reviews which accompany the milestones ensure compliance with the agreed development steps and product maturity levels. A status report resulting from these reviews must be sent unrequested to the contact at ASMPT. In the event of deviations, the concrete list of measures containing the corrective measures must be enclosed.

7.1.3. Manufacturing feasibility analysis – DFMA

Before submitting an offer or confirming change notifications, the supplier must evaluate feasibility of manufacture using the available processes in the light of the manufacturing documents. At least the relevant points, such as the work plan, production and quality assurance, must be included.

The manufacturing feasibility analysis must be conducted in accordance with the VDA 4 principle (methods) and must be documented in the “Manufacturing feasibility” form. The form can also be found on the ASMPT homepage (see 11.1).

If the supplier is responsible for developing the product, the DFMA principles must be observed.

If the ASMPT design does not correspond to the manufacturing process, the supplier must contact the responsible developer and advise on appropriate design modifications (Design for Manufacturing and Assembling).

7.2. Hardware and software development

The development process at ASMPT requires suppliers and system partners to provide a high degree of structured and closely coordinated interaction, particularly for products and services provided specifically for the customer. To achieve this, ASMPT expects samples and documents to be provided during the early phases of development for the purposes of field trials.

The Requirements Specification and/or other specifications in which the quality requirements and operating conditions are stipulated form an important basis for the development work.

The quality requirements to be met by the supplier in a development job will already be defined and described at the beginning of the development phase in the context of a contractual agreement (e.g. order or development contract).

7.3. Documentation

7.3.1. Product documentation:

The documents in this category describe the development process for a product up to production. The product documentation provides information on the underlying conceptions which led to the generation of the product. Furthermore, it provides evidence that the proper procedures have been followed during development and that the relevant legislation and guidelines have been observed. ASMPT expects its suppliers to maintain suitable product documentation.

7.3.2. Technical documentation

The technical documentation for systems generally comprises the user manual, service manual, installation manual, software version description and spare parts documentation**.**

Creation of technical documentation on the part of the supplier is specified in an agreement and/or the project or product requirements. The structure, layout and file formats to be supplied form part of the agreement.

7.4. Production

7.4.1. Production planning

To achieve the quality required by ASMPT, the supplier must perform systematic planning of the manufacturing processes. This is part of the quality assurance system used by the supplier. The individual steps in the manufacturing of the product to be supplied must be documented in work and process instructions.

The project plan for the manufacturing process must also meet all the requirements listed under 7.1.1 (Project planning).

7.4.2. Production and assembly equipment

The use of suitable production and assembly equipment must be planned at an early stage in order to ensure that the equipment is available with sufficient capacity at the start of series production. Employees must be traceability trained in the use of this equipment.

Service and maintenance of the equipment must be planned in a preventive manner. Evidence of systematic and consistent conduct of service and maintenance must be provided. The scope of and intervals between maintenance activities must correspond to the plant manufacturer's instructions.

The supplier must establish and maintain an emergency strategy for processes that could prevent its capability to deliver.

7.4.3. Test planning / test methods / test equipment / statistical methods

The supplier must safeguard quality in so reliable a way that adequate control of the manufacturing processes (process capability) is ensured in order to meet the agreed requirements.

The extent of testing during the manufacturing process must be planned and defined in the light of the degree of the achievable and achieved process capability, the respective quality attributes and the possible impact of faults.

The tests must be documented so that the supplier can, at any time, prove that the specified requirements have been met over the entire manufacturing period. This also includes the recording of all tests accompanying production in a way suitable for analysis.

The application of statistical methods (e.g. SPC, MFU) makes it possible to analyze and prove the quality capability of relevant process and product attributes. They enable the user to detect changes in the process faster and to eliminate impacts on the customer's product at an earlier stage.

For further information on process capability and SPC, see ISO 11462-1 and 11462-2 or VDA Volume 4.

Critical attributes for which process capability cannot be achieved (Cp/Cpk < 1.33) due to narrow tolerances or unstable processes must be monitored by means of a 100% verification.

7.4.3.1. Process FMEA

To ensure that the manufacturing process is free of errors, ASMPT expects its suppliers to perform a process FMEA. This is designed to detect potential sources of error and to enable preventive measures to be taken to avoid errors.

When dealing with similar products and product families, it is possible to start with a generic FMEA, but this must then be continued individually to make it possible to implement changes, for example in the event of complaints.

7.4.3.2. Testing equipment

The testing equipment used must be sufficiently accurate in respect of the specified tolerances. A test equipment monitoring system according to the specifications of ISO 10012-1 must be maintained. Test equipment and measuring systems must operate at a resolution smaller than 5% of the tolerance of the attribute.

The measurement uncertainty of the measuring equipment used must be taken into account. The supplier must ensure that the measuring equipment used for quality assurance is inspected and calibrated at defined intervals.

Analyses of the measurement systems must be employed to ensure that the measuring equipment and devices used are capable of providing meaningful measurements in the context of statistical process control and process capability analyses. Any deviations and uncertainties that arise in the measurement system must be proportionate in relation to the threshold values and process variance.

The supplier must ensure that any variance that does arise during series measurements cannot be traced back to any lack of precision or accuracy on the part of the measuring system.

For further information, see Measurement System Analysis (MSA) VDA Volume 5.2

7.4.3.3. Internal audits

Regardless of the annual system audit, which is required to maintain a QM system in accordance with ISO 9001 or further standards, process and product audits must also be carried out specifically for ASMPT.

Process audit: Every process through which ASMPT products pass must be audited at least once a year.

Product audit: At least one product from each ASMPT product family must be audited at least once a year.

All audits are to be included in the annual audit plan and followed up. Corresponding measures and action plans must be derived from the results of the audits and worked through.

7.4.4. Performing tests

All individual sub-components based on individual drawings which are purchased by the supplier or which are specified by ASMPT but delivered directly to the supplier, must be handled and released by the supplier based on an approval procedure in accordance with VDA 2 (initial sampling). The cover sheet must be enclosed with the initial sample documents sent to ASMPT.

Tests during production permit the early detection of faults as well as selective countermeasures. This helps prevent negative impacts on the capability to deliver and reduces reject and rework costs.

All purchased parts must be subjected to regular quality testing before use. The supplier must perform incoming goods inspections to ensure that all raw and semi-finished products used meet the requirements.

The same procedure applies to parts which have been further processed in any way by sub-suppliers. Here again, the attributes must be checked in accordance with the agreed control plan upon receipt of the goods.

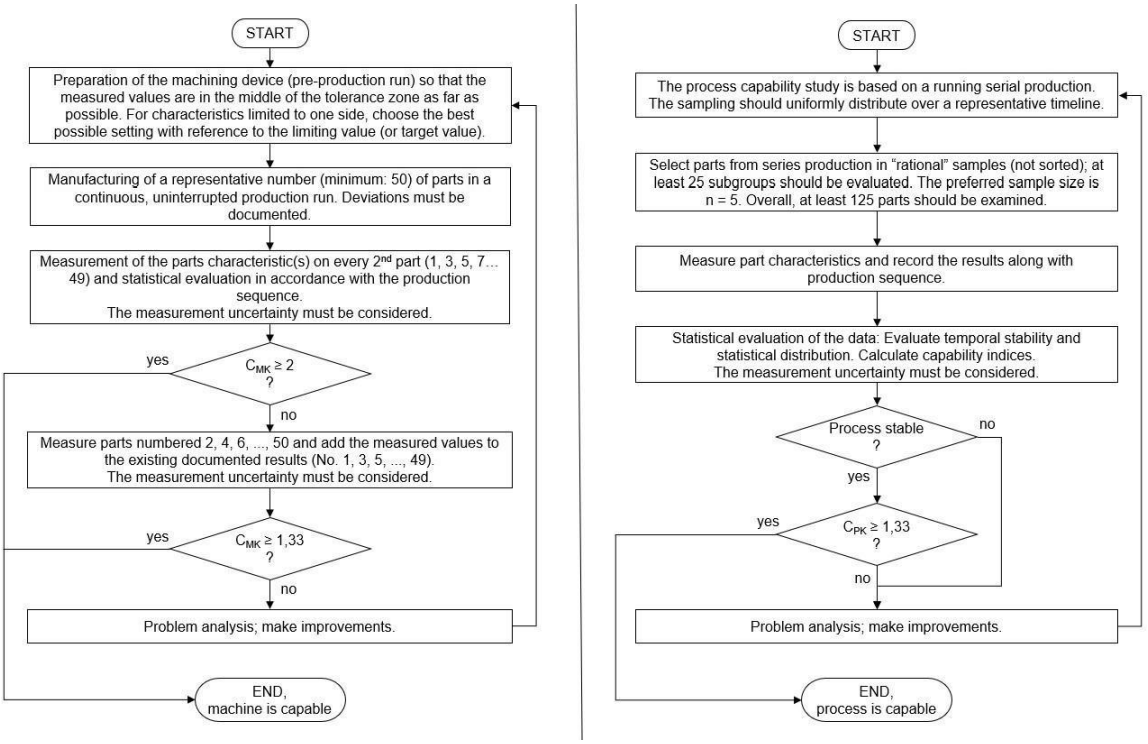
In-production tests must always be planned for quality-relevant manufacturing steps.

In order to ensure fault-free products as set out in the “zero defects” quality goal, ASMPT considers it indispensable to conduct a final test unless the quality requirements have already been reliably validated in the previous processes.

Functional modules must be subjected to a 100% functional test prior to delivery. The results must be recorded as a “First Pass Yield” report.

Reworking performed on nonconforming assemblies must be recorded and evaluated on the basis of the fault attributes.

7.4.5. Machine and process capability analysis



If the required machine or process capability is not achieved, a 100% inspection must be performed for the attribute in question.

7.4.6. Test records and archiving

Quality records provide the evidence that the quality requirements have been met. They must be maintained in a way that permits their digital analysis and enables them to be uniquely assigned to the tested products.

The quality records must be kept in compliance with the applicable legal provisions. The responsibility for proper archiving lies with the supplier.

The records must be made available for inspection by ASMPT on request and serve as the basis for cyclic quality discussions between the supplier and ASMPT.

7.4.7. Initial sample inspection

Initial sample inspection must provide evidence prior to the start of series production that the quality requirements that have been agreed and defined in drawings and specifications are met.

Initial samples must be produced entirely using series equipment under series process conditions.

At least 3 units must be subjected to full testing of all attributes by the supplier.

The number of initial samples to be manufactured will be specified by ASMPT in the order for the initial samples.

The aim of this procedure is to obtain an initial indication of whether the production process is repeatable and stable and possesses the necessary capabilities in respect of the accuracy requirements.

An initial sample inspection must always be conducted for / in the case of:

- Parts / assemblies (new parts) manufactured by a supplier for the first time.
- Major changes initiated by ASMPT in the light of the requirements defined in the change requests
- Product changes initiated by the supplier or its subcontractors if changes have an impact on form and appearance, interchangeability or functionality as well as performance features.
- Production relocations initiated by the supplier or its subcontractors with respect to function-relevant / critical processes.

- Changes of the production process at the supplier or its subcontractors with respect to function-relevant / critical processes.
- Interruptions to production of more than one year.

In the case of production relocations and changes of production processes with respect to function-relevant or critical processes, the supplier is always required to notify ASMPT in order to agree on the scope, the implementation and number of initial samples to be supplied.

As a rule, the order to produce initial samples will be defined by ASMPT in the order or change notification.

The initial samples must be fully inspected in the light of the quality attributes that are defined in the drawings and specifications with respect to dimensions, materials, functionality, appearance, surface quality, etc., if possible by means of an inspection of variables (measuring inspection). This may involve the use of external services. The parts must be clearly identifiable (numbered) and unambiguously assigned to the documentation.

The aim must always be to produce each attribute within a process that meets the capability criteria. The measuring and test results must be evaluated in the light of this objective.

Scope of initial sample documentation:

- Cover sheet of initial sample test report (current version on ASMPT homepage)
- Documentation of test results using the forms provided for this purpose.
- Test results shall be recorded as nominal values (lower and upper tolerance limits), actual values and a column indicating ok/nok to enable their quick and easy comparison.
- It must be possible to assign the report results and test results unambiguously to the numbered parts and these results must be enclosed together with the date / signature corresponding to the goods delivery.
- Reports on life cycle, reliability or other special tests
- Completed and signed "Manufacturing Feasibility Study" form, including additional sheets (current template on ASMPT homepage)
- Material certificate
- Evidence of compliance with required legal provisions (e.g. environment, safety)
- Declaration of conformity with the specified requirements for purchased parts / components used.
- Control plan that describes production process control
- FMEA for category A parts
- Packaging proposal for series shipment (current template on ASMPT homepage)
- Initial sample reports (cover sheets) of sub-components and sub-assemblies that confirm their release
- Drawings showing the marked inspected characteristics (assignment to test result, e.g. by sequential number)

Fundamentally, all documents that are listed in the template of the initial sample cover sheet must be prepared and sent with the labeled initial samples. If not all the documents are available, the relevant scope of initial sample documentation must be agreed with the responsible SQM in the review meeting.

The documentation can also be supplied by email or file sharing service if so agreed with ASMPT. You can find the email address for initial sample documentation in Section 11.2.

Incomplete initial sample deliveries will result in the refusal to accept the initial samples!

All the quality requirements must be met, deviations are not permissible! If deviations are approved in advance by ASMPT, then these must be clearly indicated in the initial sample test report and noted separately in the comments. The signed tolerance application must be enclosed as an annex with the documentation.

After the samples have been submitted and the initial sample inspection reports have been supplied, the ASMPT Incoming Goods Inspection department will conduct a counter-check. It is also possible to conduct a joint inspection at the supplier’s premises if so agreed in advance.

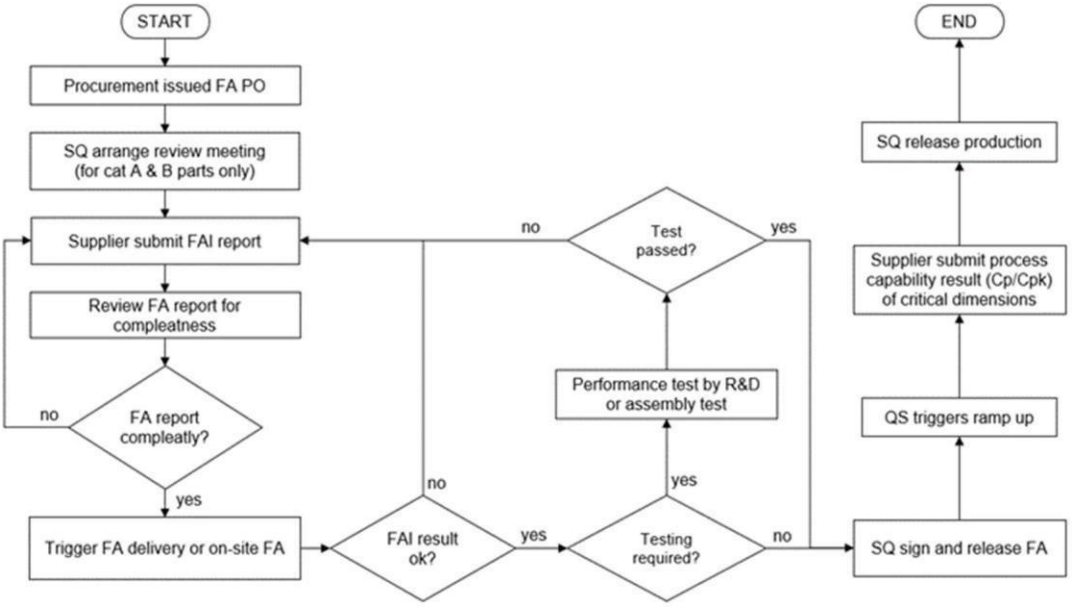
The release of the samples does not dispense the supplier from its responsibility for the quality of its products.

The release of the initial samples does not constitute a delivery order.

A positive decision regarding the initial samples is a basic condition for the start of series delivery. Without this, the supplier is not entitled to supply ASMPT with this article.

Released initial sample reports must be retained for the entire delivery time and for 7 years after this.

7.4.7.1. Initial sample release, flow chart



7.4.8. Requalification

All products delivered to ASMPT must be subjected to frequent requalification tests. These make it possible to detect whether dimensional changes have taken place over time, for example due to wear and tear. At least the dimensions specified on the drawing must be checked and verified on 3 parts.

The requalification interval is also defined as part of the coordination of the control plan. The definitions must be included in the control plan. If no special agreements have been arrived at regarding this, a requalification for “direct from die” parts is required at the latest when half of the planned tool life is reached. For the remaining term, to be carried out at least annually in the same month in which series release was issued.

The supplier archives the results of the requalification. If dimensions are outside the specified tolerance or if this is to be expected in the very near future based on the results of previous tests, this must be reported to the ASMPT Purchasing department together with advice on how to proceed.

7.5. Identification and traceability, configuration documentation

For reasons of product liability, special attention must be paid to safety-relevant components and assemblies.

Failure to comply with the minimum requirements in the respective countries can lead to severe fines, recall or replacement deliveries or a sales ban in the case of quality defects.

In the case of a product safety incident, the proper conduct of testing and the traceability of the results must be proven for the components and assemblies concerned.

To guarantee the traceability of the delivered products, the supplier must clearly identify the products that it has delivered or manufactured that are relevant for the safety or functionality of the ASMPT products.

The form and content of the labeling and documentation must be agreed with ASMPT, unless already stated in the product documentation.

7.6. Delivery to ASMPT

Deliveries must be clearly labeled so that they can be unambiguously assigned to the delivery documents. The delivery documents must contain information on the supplied material together with the corresponding material numbers and the delivered orders.

For information on the labeling of packaging units, see Section 9.7.5

7.7. Quality complaints

7.7.1. Defective products at ASMPT

If deviations from the agreed specifications and requirements are detected during the tests or during production operations at ASMPT, the following measures may become necessary in coordination with the supplier in addition to any claims and rights of ASMPT constituted according to the order conditions in connection with the applicable legal provisions:

- Rejection of the delivered batch by ASMPT
- Immediate replacement delivery by the supplier for defective parts
- 100% screening by the supplier
- Rework on site by the suppler
- Rework on site by the supplier.

7.7.2. Notification of defects and statements

Every rejection of defective components and modules by ASMPT will be accompanied by a notification of defects. The supplier will usually be requested to supply the result of its investigations and the resulting corrective and preventive measures based on the 8D system:

24 hours	Confirmation (Agreement with or rejection of the complaint made by ASMPT SCM)
3 working days	Ad hoc measures – (firewall = 100% check of all parts with regard to the attribute that is the object of the complaint before delivery, inspection of the supplier's stocks, parts in transit, in the ASMPT warehouse and returned parts, designation of a "clean point", as of which there are no further faulty parts in the supply chain due to the implemented safeguards)
4D	10 working days from the time the supplier received the defective parts/sufficient information and photos to perform the fault analysis.
8D	20 workings day from the time the supplier received the defective parts/sufficient information and photos to perform the fault analysis.

The report must be sent to ASMPT by email in the sequence shown above.
You can find the email address for lodging complaints in Section 11.2.

The number of working days is a maximum value. ASMPT recommends the supplier to complete the 8D process as quickly as possible in order to prevent further rejects and the associated costs. If the preparation of the final 8D report exceeds the time limit, without consultation of ASMPT, the complaint is considered to be acknowledged by the supplier.

Adherence to the predefined timeline and the quality of the content of the 8D reports form part of the annual supplier evaluation.

The 8D report must contain an unambiguous reference to the notification of defects (indication of the number and date of the notification of defects, the ASMPT material number and the number of parts).

The report must contain the following items based on the 8D method:

- Indication of the individual and/or team responsible for handling the issue.
- Short description of the problem for the detected defect.
- Initiated ad hoc measures with indication of the responsible individual and the deadline for completion.
- Analysis of causes using methods such as 3x5Why, Ishikawa, Mind Map or the systematic planning of experiments. "User error" can never be considered a cause on its own.

- Measure for fault elimination “Training” on its own is never sufficient.
- Measurements and/or inspections for the identification of the cause and/or fault, together with specification of the responsible person and the deadline for completion.
- Measure to prevent the repetition of the problem with indication of the responsible individual and deadline for completion.
- Anchoring of the corrective measures in the system and extension to similar processes and products.
- Evaluation of the effectiveness of the measure with indication of the responsible individual and deadline for completion.

7.7.3. Analyses of returned goods

For all reworking that does not correspond to the standard process, work and test instructions must be drawn up, agreed on with ASMPT R&D and approved by them.

The extent of the reworking required for all parts, components and modules must be documented and must be judged as “compliant with specifications” on the basis of inspections.

These evaluations serve as the basis for regular quality reviews involving the supplier and ASMPT.

7.7.4. Defective product concessions for the supplier

The concession is designed to provide a one-time opportunity to supply parts that are not compliant with specifications to ASMPT following prior approval.

The acceptance of a tolerance application is a delivery release for individual parts, assemblies and materials that do not correspond to the ASMPT specifications. Such approvals are restricted in terms of quantity and/or time.

A concession based on a tolerance application must always be issued in writing. A template can be found on the ASMPT homepage. It must be requested via the responsible Procurement department or the Supplier Quality department at ASMPT.

A supplier’s request for a concession must include:

- Description of the deviation/defect
- ASMPT material number, including the functional and product version
- Affected quantity for which the concession is desired
- Affected serial numbers, if present
- Definition of the corrective and preventive measures for subsequent reliable and permanent avoidance of the fault

A concession can only be issued if the functionality, durability, reliability, tactile and visual properties and safety of the affected products are not impaired.

A copy of the released tolerance application must be enclosed with the delivery.

7.7.5. Prototypes and small series

Prototypes and small series must be measured and recorded at the supplier based on the appraisal drawing provided. The "Prototype release" form, which is available on the ASMPT homepage, must be used. If no appraisal drawing is provided, all the attributes of the drawing must be verified. In the event of deviations, the supplier must submit a tolerance application to ASMPT and obtain approval before delivery.

The number of parts to be measured is specified in the order. If this specification is missing, the supplier must agree this with the responsible SQE. It can happen that several identical parts are installed in a prototype machine. In this case, we are in the presence of a “small series”, for which no series release will be issued.

The cover sheet including the measurement reports, references to the drawing and, if applicable, the material certificate must be sent to the e-mail address for prototypes as indicated in Table 11.2 before delivery. The cover sheet must also be printed (in color) and affixed to the top of the box or packaging so that it is clearly visible.

In the case of prototypes, it is particularly important to ensure that all drawing specifications are adhered to. If the parts do not match, extensive tests would not provide the correct information.

7.8. Returns processing

7.8.1. General procedure

As a rule, returns are processed by means of repair orders.

Returns can be products:

- that are sent to the supplier for repair because they have been damaged at ASMPT and must be repaired.
- that exhibit quality defects for which the supplier is responsible. In this case, the repair order is issued in addition to the notification of defect.

Returns for repairs based on complaints may not be sent until a complete 8D report has first been submitted. Otherwise the delivery will be rejected.

When these products are re-delivered, it is important to note that the deliveries are made to execute the corresponding repair orders and not any another order that is still open.

It is necessary to make sure that no repaired or reworked products are delivered as new products.

Repaired and returned parts are not manufactured using the serial process and this must be recognizable upon delivery. The “Returned Repair” form must therefore be completely filled in and enclosed with the delivery.

It is essential to adhere to the delivery date stated on the repair order, in particular since a late delivery can no longer be accepted if a change is made to the drawing.

8. Product safety and product-related environmental protection

As a fundamental principle, all manufacturers have an obligation to supply products that comply with the safety regulations of the country in question.

The products supplied must not under any circumstances represent a hazard to life or limb, health, property (other items or living beings) or the environment.

8.1. Conformity of ASMPT products

ASMPT’s primary markets are located in Europe, North America and Asia.

Suppliers and manufacturers of products are obliged to observe the norms, standards and statutory requirements that apply to their products in the relevant countries and to be in a position to provide evidence of this.

In addition, ASMPT must also naturally comply with applicable norms, standards and statutory requirements.

Consequently, suppliers and manufacturers must also, in addition to the statutory requirements, observe the directives and standards listed below for the products supplied to ASMPT.

Directives and standards for Europe:

- Regulation (EC) 1907/2006 of the European Parliament and Council of 18 December 2006 concerning the Registration, Evaluation, Authorization and Restriction of Chemicals (REACH)
- Directive 2011/65/EU of the European Parliament and Council of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS 2)
- Commission Delegated Directive (EU) 2015/863 of 31 March 2015 amending Annex II to Directive 2011/65/EU of the European Parliament and Council as regards the list of restricted substances

Directives and standards for China:

- GB/T 26572-2011 Requirements for Concentration Limits for Certain Restricted Substances in Electrical and Electronic Products.
- SJ/T 11364-2014 Marking for the Restricted Use of Hazardous Substances in Electronic and Electrical Products.

Directives and standards for North America:

- UL 508 Industrial Control Equipment

- UL 94 Flammability testing of Plastic Materials for parts in Devices and Appliances

Product-related requirements in respect of norms and standards that go beyond this are defined in the product specifications.

For further information and requirements on product-related environmental protection, see Section 9.8.

8.2. Archiving

The supplier is obliged to ensure the seamless archiving of all quality-related documents and data for the purpose of product liability / product safety.

The archiving of documents and data forms the technical foundation in the event of recourse.

If not defined to the contrary in the present document, the archiving of quality-related data and documents must be ensured for a minimum period of six years for paper copies and ten years for computer files.

Longer retention periods may result from the life-cycle of the corresponding products, statutory limitation periods for the purposes of product liability or specifically applicable statutory requirements.

In all cases, consult ASMPT before destroying any quality-related records in order to determine whether the records are still needed.

9. Technical requirements

The requirements defined and standards listed in this section shall apply unless other specifications are defined in the product-specific documentation.

9.1. General requirement ISO GPS 8015

ASMPT uses the ISO-GPS 8015 standard for tolerancing in all new drawings. It is therefore essential that the supplier is familiar with this standard. All employees who are entrusted with process development, production or measurement testing of ASMPT parts must possess proof of at least basic training. The supplier must appoint an internal or external employee as the main technical contact person and inform ASMPT of this at the start of the project. This main contact must be able to provide proof of external training in this area that goes beyond the basic information.

Regarding updates and revisions of all standards mentioned in this document, suppliers must always refer to the most recent state of the art.

9.2. Mechanical components and assemblies

The principle of independence as defined in ISO 8015 shall apply as a standard for tolerances.

9.2.1. General tolerances

Applicable standards

ISO 1101	Geometrical product specifications (GPS) - Geometrical tolerancing - Tolerances of form, orientation, location and run-out
ISO 5459	Geometrical product specifications (GPS) - Geometrical tolerancing - Datums and datum systems
ISO 2692	Geometrical product specifications (GPS) - Geometrical tolerancing - Maximum material requirement (MMR), least material requirement (LMR) and reciprocity requirement (RPR)
ISO 14405	Geometrical product specifications (GPS) - Geometrical tolerancing - Dimensional tolerancing
ISO 5458	Geometrical Product Specifications (GPS) - Geometrical tolerancing - Positional tolerancing
ISO 1302	Geometrical Product Specifications (GPS) - Indication of surface texture in technical product documentation
ISO 2768-1	General tolerances; Tolerances for linear and angular dimensions without individual tolerance indications

ISO 2768-2	General tolerances; Tolerances for features without individual tolerance indications

The general tolerances apply to finished parts, including to surfaces according to DIN ISO 2768 Parts 1 and 2. ASMPT has defined the tolerance classes “m” (T1) and “H” (T2).

9.2.2. Fits

Applicable standards

ISO 286-1	Part 1: Basis of tolerances, deviations and fits
ISO 286-2	Part 2: ISO 286-2 Tables of standard tolerance classes and limit deviations for holes and shafts

This standard defines the fit systems of basic holes and basic shafts as well as the terms of main dimensions, fundamental tolerances, tolerance zone, degree of tolerance and tolerance class.

9.2.3. Drilled / counter bored holes

Applicable standards

ISO 13715	Technical product documentation—Edges of undefined shape—Vocabulary and Indications
ISO 15065	Counter bores for countersunk screws with standard heads according to ISO 7721
DIN 974-1	(Eng) Counter bores for cap screws
DIN 974-2	(Eng) Counter bores for hexagon head cap screws
ISO 273	Fasteners – Clearance holes for bolts and screws

For blind holes, the specified dimensions for hole depths without specific tolerances should be considered as minimum dimensions.

The edges that result from the production of drilled and counter bored holes must be free of burrs as defined in DIN ISO 13715.

A chamfer of -0.1 to -0.5 mm is required for the dimension “a” in accordance with DIN ISO 13715 unless otherwise specified in the drawings.

Through-holes must be produced according to ISO 273, design “medium (m)”.

9.2.4. Threads

Applicable standards:

DIN 13-1	ISO general-purpose metric threads - Part 1: Nominal sizes for coarse pitch threads; nominal diameter from 1 mm to 68 mm
ISO 3508	Thread run-outs for fasteners with thread in accordance with ISO 261 and ISO 262 DIN 78 Protrusions of bolt ends
DIN 7952	Sheet metal anchorage with threads; dimensions
ISO 261	ISO general-purpose metric screw threads – General plan
ISO 262	ISO general-purpose metric screw threads – Selected sizes for screws, bolts and nuts
ISO 965	ISO general-purpose metric screw threads – tolerances
DIN 76-1	Thread run-outs and thread undercuts

Dimensions for thread depths without specific tolerances should be considered as minimum dimensions.

Thread run-outs and undercuts must be designed as described in standard ISO 3508.

Deviating from ISO 3508, a 90° counter bore is permitted for internal threads, in which case the diameter of the counter bore should be 1–1.05 x the internal diameter of the thread.

Thread ends must be produced according to DIN 76-1. For external threads, a 45° chamfer must be added, with an incomplete thread in the run-out area to the head up to 2x P (P = thread pitch) being permitted.

9.2.5. Quality of edges

Applicable standards

ISO 13715	Technical product documentation - Edges of undefined shape - Indication and dimensioning

The edges must be produced free of burrs according to DIN ISO 13715.

In the case of machined parts (with the exception of plates and thin-walled parts), the dimension “a” must be between -0.1 and - 0.5.

In the case of sheets or thin-walled parts, it must be ensured that the width of the remaining surface between two deburred edges does not become smaller than the dimension of the removed material. In cases where deburring causes new risks of injury, the edges must be rounded in a suitable manner or the edge quality is to be agreed on with ASMPT

9.2.6. Quality of bends

Applicable standards

DIN 9003	Aerospace; bending of sheets, plates and strips of steel and heat-resisting alloys, bending radii, directions for design

The bending zones must be free from cracks and must not be coarse-grained.

9.2.7. Adhesive specifications

Applicable standards:

DIN 2304-1	Adhesive bonding technology - Quality requirements for adhesive bonding processes - Part 1: Adhesive bonding process chain
DIN 2305-3	Adhesive bonding technology - Quality requirements for adhesive bonding processes - Part 3: Requirements for the adhesive bonding personnel

When adhesive joints are required, the order documentation or drawings must include the corresponding information.

All adhesive joints must be produced according to the relevant specifications of the adhesive manufacturers.

The retaining forces indicated in the documents must be examined by means of tests, their structural capabilities must be analyzed and evidence of process reliability must be provided.

The personnel must be trained in accordance with DIN 2305-3.

9.2.8. Surfaces

Applicable standards

ISO 11664-1	Colorimetry - Part 1: CIEDE2000 Color-difference formula
ISO 2813-02	Paints and varnishes -- Determination of gloss value at 20°, 60° and 85°
ISO 2819	Metallic coatings on metallic substrates - Electrodeposited and chemically deposited coatings - Review of methods available for testing adhesion
ISO 9712	Non-destructive testing - Qualification and certification of NDT personnel

The attributes specified in the drawings refer to the finished parts including their surface properties. Damage and scratches are always unacceptable. This applies especially to visible and plastic parts.

9.2.8.1. Testing of surfaces in general

All employees who visually check and/or evaluate surfaces must be trained in accordance with the basic requirements of ISO 9712. This always also includes an annual eye test according to ISO 9712 for test assistants. Corresponding evidence must be provided for this.

Sufficient adhesive strength (adhesion) of coatings or paintwork must be demonstrated, when applicable, by means of a cross-cutting test according to DIN EN ISO 2409 for each initial sample test on the component itself, as well as at least on a test panel before each new process start.

9.2.8.2. Surface quality

Surface quality is described in the ASMPT surface quality standard. This document is available for download on the ASMPT homepage.

9.2.9. Requirement for ESD conductivity

If ESD (Electrostatic Discharge) requirements are specified for parts or assemblies, the supplier must ensure compliance.

If parts or assemblies are procured from sub-suppliers, the supplier must request a measurement report for ESD conductivity, or a corresponding test must be carried out when the goods are received by the supplier.

The test procedures for determining the resistance and the specific resistance of solid materials to prevent the accumulation of electrostatic charges must be carried out in accordance with IEC 6140-2-3 and IEC 61340-5-1.

9.2.10. Welding / flame-cutting

Applicable standards:

ISO 630-1	- Structural steels - Part 1: General technical delivery conditions for hot-rolled products
ISO 10474	Steel and steel products – Inspection documents
ISO 3834-1	Quality requirements for fusion welding of metallic materials - Part 1: Criteria for the selection of the appropriate level of quality requirements
ISO 3834-2	Quality requirements for fusion welding of metallic materials - Part 2: Comprehensive quality requirements
ISO 3834-3	Quality requirements for fusion welding of metallic materials - Part 3: Standard quality requirements
ISO 3834-4	Quality requirements for fusion welding of metallic materials - Part 4: Elementary quality requirements
ISO 2553	Welding and allied processes - Symbolic representation on drawings - Welded joints
ISO 9013	Thermal cutting - Classification of thermal cuts - Geometrical product specification and quality
ISO 13920	Welding - General tolerances for welded constructions - Dimensions for lengths and angles - Shape and position
ISO 10042	Welding - Arc-welded joints in aluminum and its alloys - Quality levels for imperfections
ISO 9606-ff	Qualification testing of welders - Fusion welding - Parts 1 to 5
ISO 14731	Welding coordination - Tasks and responsibilities

Welders must have a certificate in accordance with DIN EN ISO 9606-1.
The supplier must have or must arrange for the appointment of a welding coordinator in accordance with ISO 14731.
The supplier must meet the welding requirements as laid down in DIN EN ISO 3834.

Table: Consideration of additional requirements

Aspect	Standard	Requirement	Additional Requirement	Comment
Material	DIN EN 10 025 Structural steels	S 235 JR G2 Material No. 1.0038	DIN EN 10 204 Works test certificate 2.2 (minimum)	

Operational requirements	DIN EN ISO 3834	Part 2 (Comprehensive) Part 3 (Standard)		Maintain evidence relating to welder certificates and welding supervisors
Indication in drawings	DIN EN 22 553 (ISO 2 553)			
Weld seam quality	DIN EN ISO 5817	Classification group “C”	Undercuts “B” Excessive seam reinforcement “B”	Not permissible: • Spattering • Stuck wire ends • Open irregularities (e.g. pores) • Open front edges at sheet ends • Cracks
Flame-cutting quality (autogenous)	DIN EN ISO 9013	Cutting quality II (A or B)		Validity of tolerances unless otherwise specified
Flame-cutting quality (laser)	DIN EN ISO 9013			Validity of tolerances unless otherwise specified

9.2.11. Castings

Applicable regulations, guidelines and standards:

ISO 4990	Steel castings -- General technical delivery requirements
ISO 16220	Magnesium and magnesium alloys -- Magnesium alloy ingots and castings
ISO 15201	Zinc and zinc alloys -- Castings – Specifications
ISO 8062-ff	Geometrical product specifications (GPS) - Dimensional and geometrical tolerances for molded parts Parts 1 to 3
ISO 17804	Ausferritic spheroidal graphite cast irons -- Classification
ISO 20457	Plastics molded parts -- Tolerances and acceptance conditions

Observance of the above specifications, guidelines and standards is mandatory. The feeder and runner system must be completely removed. All parts must be free from molding residues.

All castings must be checked for cavitation and cracking in critical places. Any measures required to ensure the quality of series parts must be defined.

Traceability back to the individual cavities must be ensured by the supplier.

Any deviations from these general specifications must be defined and must be released by ASMPT.

9.2.12. Plastic injection-molded parts

Marking

In addition to point 9.7, all plastic parts are to be marked as follows at the point indicated in the drawing:

- Instead of the production date, a date clock on which at least the year and month of production can be read can be used. The diameters can be chosen freely.
- Material number with FS (functional version).
- If there are several mold cavities or molds, an assignable mold or cavity identification must be included.
- Material identification at the part in accordance with DIN EN ISO 11469, e.g.: >PA66-GF30<

Typeface: Font DIN 1451 – H3.5, raised, 0.3mm.

If there is not enough space for all the information, the labeling will be adapted / reduced accordingly after consultation with SQ.

The supplier must ensure that the marking remains clearly legible even after any surface treatment. Illegible identification is treated as a component fault. In individual cases, Design can increase the font size or the embossing depth or change the variant from "raised" to "recessed". The corresponding information must be indicated on the component drawing.

Re-used material

Re-used material can be added on a percentage basis to the granulate or can be separately filled. In all cases, the proportion or number of possible re-uses must be documented.

The amount of material added and/or the number of re-uses must be determined by means of tests and documented at the time of process development. The following properties of the resulting parts may deviate from those of the base material by a maximum of 3%:

- Heat distortion temperature
- Flexural strength
- Tensile strength
- Elasticity modulus
- Electric strength
- Resistance to leakage current

When dealing with similar products, empirical values can be used, provided that the material and process parameters are comparable. Proof must be enclosed with the initial sample documents.

Alternatively, the information provided by the manufacturer regarding the repeated use of material can also be implemented. In case of doubt, reuse should always be avoided.

With regard to environmental protection, non-reusable material must always be properly disposed of or returned to the raw material manufacturer.

Residual moisture and pre-drying

It is always necessary to pay attention to the humidity of the material. If dryness cannot be guaranteed due to storage conditions or other circumstances, pre-drying must always be performed. The supplier must always act on the basis of the state of the art and the specific processing specifications issued by the granulate manufacturer.

The value for the permissible residual humidity in the raw material must be documented in the form of a "from ... to ..." specification in the control plan and must be checked regularly, at least 4 times evenly distributed over the year. The residual humidity must also be checked as part of product audits. Appropriate testing facilities must be available.

Process parameters

At least the following parameters must be defined and appropriately monitored:

- Melting index
- Temperature range of the mass
- Mold temperature (measured directly at the mold)
- Filling pressure
- Switching point / holding pressure
- Cooling down time

A measuring device for measuring the melting index in accordance with DIN 53735 must be present or available from a third-party provider in order to determine the MFI (melt flow index) and permit the optimum calculation and design of the mold.

Injection molding tools

As described in point 5.5, corresponding lists must be kept of the inventory of tools with records of frequency of use, operating time, the number of parts produced, maintenance and repairs.

9.3. Electrical / electronic assemblies (printed circuit boards)

9.3.1. Applicable regulations, guidelines and standards

The most recent versions of the standards listed below shall apply.

9.3.1.1. General:

IPC-9191 General Guidelines for Implementation of Statistical Process Control (SPC)

EN 61010-1	Safety requirements for electrical equipment for measurement, control and laboratory use – Part 1: General requirements

9.3.1.2. Assemblies:

IPC-A-610	Acceptance of electronic assemblies, Class 2 in general, for exceptions, see Section 9. 2. 22.
IPC J-STD-001	Requirements for Soldered Electrical and Electronic Assemblies Class 2 in general
IPC-7711/21	Rework, Modification and Repair of Electronic Assemblies
IPC-CC-830	Qualification and. Performance of Electrical Insulating Compound for Printed Wiring Assemblies

9.3.1.3. Printed boards:

IPC-A-600	Acceptability of Printed Boards
IPC-6011	Generic Performance Specification for Printed Boards
IPC-6012	Qualification and Performance Specification for Rigid Printed Boards
IPC-6013	Qualification and Performance Specification for Flexible Printed Boards

9.3.1.4. Design:

IPC-SM-782	Surface Mount Design and Land Pattern Standard
IPC-2152	Standard for Determining Current-Carrying Capacity in Printed Board Design
UL 94	Flammability of Plastic Materials for parts in Devices and Appliances
EN 60825-ff	Safety of laser products; Parts 1 to 12

9.3.1.5. Handling:

EN 61340-5-1	Electrostatics - Part 5-1: Protection of electronic devices from electrostatic phenomena - General requirements
EN 61340-5-3	Electrostatics - Part 5-3: Protection of electronic devices from electrostatic phenomena - Properties and requirements classification for packaging intended for electrostatic discharge sensitive devices

9.3.2. Requirements

If applicable, the requirements of the guidelines and standards set out in 9.3.1 must be complied with.

For reasons of environmental protection, the “no clean process” must always be adhered to during the manufacture of printed circuit boards.

On printed boards, it is only permissible to use display LED`s (e.g. Power ON / OFF etc.) which do not fall in the scope of the laser protection class according to EN 60825-1.

Electronic assemblies (printed boards) from ASMPT must meet the requirements placed on Class 2 products for general applications.

Industrial electronic equipment must meet the acceptance criteria set out in the standards IPC-A-610 and J-STD-001.

Exceptions from this rule include:

1. Residual wire lengths on the soldering side of printed boards. The maximum permissible cut lead length is 2mm; more accurate values must be specified in the documentation of the printed boards.
2. Population with components: IPC-A-610, vertical - radial leads
3. Soldered connections: IPC-A-610, solder fillet (various chapters)

Items 2. and 3. are subject to the **Class 3** requirements for power electronics.

Acceptance at ASMPT takes place according to IPC-A-610.

The printed boards used must meet the UL requirements indicated in UL 94 V0. The UR logo, the manufacturer’s logo, the board type and the flame resistance class in accordance with UL 94 must be etched

into the board as part of the layout. The supplier must provide evidence of the manufacturer's UL approval during the initial sample testing of the assemblies.

9.3.3. Monitoring of the manufacturing process

Adherence to IPC-9191 "General Guidelines for Implementation of Statistical Process Control (SPC)" is recommended for the statistical monitoring of the manufacturing processes.

9.3.4. Qualification of employees

Production

Employees who are involved in special processes must be specifically trained.

All employees who are entrusted with soldering must be trained according to guideline IPC J-STD-001 and must maintain this qualification. Alternative, equivalent training courses are also accepted (e.g. AVLE1510 and AVLE1511).

Repair, rework and modifications

Employees, who perform repair, rework and modification operations on printed circuit boards must be qualified at "Expert" skill level according to IPC-7721 The corresponding training certificates must be maintained. "highest level" as described in IPC 7711 is required for the "level of conformance".

An alternative would be the "AVLE soldering license module 4 - Rework of complex components".

9.3.5. Tests of electrical/electronic assemblies (printed boards)

9.3.5.1. Incoming goods inspections

Purchased components, printed boards and manufacturing equipment must be subjected to a defined quality test (e.g. solderability test) which has been agreed on and approved by ASMPT prior to their use.

9.3.5.2. Testing of electrical printed circuit boards (PCBAs) before placement

A Solder Paste Inspection (SPI) is mandatory. The SPI is validated during New Product Introduction (NPI) on the basis of a First Pass Yield (FPY) consideration (target: FPY >= 99%). Regular verification of the FPY and an analysis of the collected data must be implemented to gain information regarding failure trends and introduce suitable countermeasures.

9.3.5.3. Testing of PCBAs after placement and soldering

- The Automatic Optical Inspection (AOI) is mandatory (for prototypes and pilot series with a volume of less than 10 parts, a manual visual inspection is permissible following agreement with ASMPT). Validation of the AOI during NPI on the basis of an FPY consideration (target: FPY >= 99%). A regular verification during ongoing operation on the basis of OK/NOK samples and FPY analysis must be implemented and analyzed regularly to gain information regarding failure trends and introduce suitable countermeasures. Components with shadowed solder joints or which are fully shadowed (for example: solder joints at pins below plug connectors or Ball Grid Arrays (BGA), components concealed by other parts like heat sinks) are considered NOT to be covered by the AOI
- In-Circuit Test (ICT) for high-volume products / Flying Probe Test (FPT) for low-volume products are mandatory. Validation of the ICT/ FPT is performed during NPI on the basis of an FPY consideration (target: FPY >= 99%). A regular verification during ongoing operation on the basis of OK/NOK samples and FPY analysis must be implemented and analyzed regularly to gain information regarding failure trends and introduce suitable countermeasures.
- If individual components are not covered by AOI (shadowing) or ICT/FPT (massive parallel circuitry – e.g. backup capacitors), then they must be covered by a Functional Test (FCT) (high-frequency signals, voltage metering, signal sequences, step function response, etc.) or Boundary Scan/JTAG. Alternatively, discussions with the ASMPT Development department must classify the risk of failure of the complete assembly in the event of a failure of an individual component as being low. The same requirements as for AOI, ICT or FPT are applicable to the validation and verification of these test methods.

- During the NPI, evidence of test coverage for each individual component on the PCBA must be provided in a Test Coverage (TC) Report predefined by ASMPT.
- Each PCBA must be tested before delivery and the positive test result of each test step must be stored together with the date and time and must be linked to the serial number via the PCBA's barcode/QR code. Results must be stored for 5 years and must be made available to ASMPT on request
- The FPY for the test devices in the NPI must also be stored for 5 years and must be made available to ASMPT on request.

9.3.5.4. Initial sample inspection on electrical/electronic assemblies (printed boards)

- The cover sheet "Initial sample inspection report for PCBA", which is available on the ASMPT homepage, must be used for initial sampling. All documents required for initial sampling are also listed on this cover sheet.

9.4. Cables, lines and wiring

9.4.1. Applicable regulations, guidelines and standards

EN 60204-1 Safety of machinery - Electrical equipment of machines, Part 1: General requirements

EN 60352-1	Solderless connections – Part 1: Wrapped connections; General requirements; Test methods and practical guidance
EN 60352-2	Solderless connections – Part 2: Crimped connections; General requirements; Test methods and practical guidance
EN 60352-3	Solderless connections – Part 3: Solderless accessible insulation displacement (ID) connections; General requirements, test methods and practical guidance
EN 60352-4	Solderless connections – Part 4: Solderless non-accessible insulation displacement (ID) connections; General requirements, test methods and practical guidance
EN 60998	Parts 1 and 2, Connecting devices for low-voltage circuits for household and similar purposes
IPC-A-620	Requirements and Acceptance for Cable and Wire Harness Assemblies
UL 94	Flammability of Plastic Materials for parts in Devices and Appliances
VDE 0100	Erection of low-voltage installations
VDE 0611-7-2	Low-voltage switchgear and controlgear; Part 7-2: Ancillary equipment - Protective conductor terminal blocks for copper conductors
EN 60947-1	Table 4, Tightening torque for the proof of the mechanical stability of screw connections/-terminals

9.4.2. Requirements

Compliance with the requirements of the guidelines and standards listed in 9.4.1, if applicable, is mandatory.

Crimped designs (burrs, cracking, asymmetry and distortion) as well as gas-tightness (all individual wires must be deformed into polygons and distributed evenly), extraction forces, electrical conductance and crimping heights must comply with the relevant design specifications.

Insulation crimping connections must meet the relevant design specifications.

The contacts to be used are specified in the bills of materials.

The use of crimp type sockets on current-carrying cables, lines and wires must be avoided!

9.4.3. Qualification of employees

Production

Employees who are involved in special processes must be specifically trained.

All employees who are entrusted with soldering must be trained in manual soldering according to guideline AVLE1510 and in machine soldering according to guideline AVLE1511 issued by the “Ausbildungsverbund Löttechnik Elektronik” as part of its “soldering license” and these qualifications must be maintained. Alternative, equivalent training courses will also be accepted. An internal trainer must have at least successfully passed the “AVLE soldering license module 3” level or an equivalent qualification.

9.4.4. Tests on preassembled cables and lines

9.4.4.1. Electrical test

Scope of test: 100%

Cables and lines with fitted plug connectors must be tested for continuity of the individual conductors and for short-circuits between conductors. The plug connectors must also be tested. The test must detect incorrect or missing connector assignments and codings.

In the case of cables fitted with wire end ferrules, each conductor must be tested for continuity. In the case of shielded cables, the shield must be treated as another conductor in the test.

9.4.4.2. Process protection of crimping quality

In order to ensure a reliable, correctly functioning crimped connection, stripping must be performed correctly.

The process capability of the stripping and crimping process must be verified in accordance with the definitions and standards defined in the requirements.

The stripping device must by checked and tested as part of every manufacturing batch.

The crimping process must be verified during the initial sample test, at the beginning and at the end of production, and at least once a day during ongoing production on the basis of a micrograph. These micrographs must be archived for verification purposes. These tests must be specified in the control plan.

9.4.4.3. Visual/measuring inspections

Inspection of cable type (in accordance with order documents):

- Number of inner conductors
- Colors of conductors (e.g. with respect to connector assignment)
- Overall shield, filler (if present)
- Numbering / coding of conductors

Check of strand structure:

- Cross-sections of individual conductors
- Shield, filler (if present)
- Implementation of protective and heat-shrink tubing depending on place of use or type of installation and based on the state of the art

Verification of cable dimensions against indications in drawings:

- Total length
- Stripped length (for round cable)
- Splicing length (for ribbon cable)
- Shield

Check of the surface characteristics of the cable jacket for damage.

Check of the stripping / splicing length and the stripping of the isolation for damage.

Check whether the cables and lines are fitted with connectors:

- Check of the connector type and the connecting elements against the order documentation
- Check of the assembly connector and strain relief or reinforced screwed pipe coupling
- Attachment of cable at connector housing (e.g. to determine whether the cable jack has been sufficiently inserted through the reinforced screwed pipe coupling and attached)
- Check of the proper mechanical assembly of connector housings (e.g. it is necessary to ensure that the crimp contact is fixed and locked in the connector housing)
- Check of the identity and identification of the prefabricated cable/line including connector designations.
- Regular examination of the pins and connectors of the testing device for mechanical damage in the light of the permissible number of connectors in the plug connector used in the testing device.
- Replacement of pins and connectors of the testing device in the event of recognizable damage in order to avoid damaging the test specimens. All test resources and test equipment must be inspected and maintained by the calibration service.

Check of the position of the marking in the light of the requirements.

In the case of cables with screw-on connectors, the extraction forces (VDE 0611) and tightening torques (EN 60947-1 Table 4) must be checked and documented. The manufacturers' corresponding handling guidelines must be observed.

9.4.4.4. Wire harness boards

If wire harness boards are used, they must be clearly assignable to the article. All markings must be clearly printed (no coding). Different colors should be used wherever possible.

Wire harness boards must be stored in a way that protects them from damage.

9.4.4.5. Initial sample inspection at prefabricated cables, lines, wiring

Test functions:

- Documentation of all nominal and actual values from the design specifications
- List of components according to bill of materials incl. sub-suppliers.
- Proof of machine capability of the crimping process based on the pull-off force (see Section 7.4.5)
- Labeling and identification of cables and lines according to design specifications and definitions in these TCOD
- Photo documentation of component and the wire harness board(s). The process should be recognizable.
- Micrographs of the crimp connection
- Confirmation of the electrical tests including test set-up according to test instructions.
- Proof of ROHS compliance if required
- Packaging proposal for serial shipment

9.5. Functional modules

The requirements for the functional modules result from the requirements for the individual components, which are defined as follows.

With respect to the quality of design of functional modules, special attention must be paid to compliance with the surface requirements and to the prevention of risks of injury (sharp edges, crushing, etc.).

Requirements relating to the installation of assemblies (e.g. cabling and piping) must be agreed on with ASMPT unless specified otherwise in the documentation.

In general, functional modules must be subjected to a functional test. The result must be recorded as FPY and made available to ASMPT on request. (e.g. type, method and scope of the functional test)

In order to ensure that all necessary test steps have been executed and that all components of the functional modules are present at the time of delivery, the supplier must prepare checklists that ensure systematic execution.

9.5.1. Initial sample inspection of functional modules

The supplier must perform initial sampling of functional modules in the guise of a product audit. Initial sample inspection may also include the auditing of the product-related order processing operation including the procurement process.

The purpose of this procedure is to ensure all quality-relevant parameters in such a way that compliance with the quality requirements for series deliveries is guaranteed.

If initial sampling is planned at the supplier, then the supplier is obliged to agree on a date for outstanding initial sampling activities with ASMPT in good time.

9.6. Packaging and transport

9.6.1. General pre-requisites

The packaging provides protection against damage or other impairment that could affect the quality of the packaged goods.

From this observation, it is possible to derive the requirements relating to the use of the packaging in the supply chain from the supplier via ASMPT and possibly all the way to the end customer.

Based on the properties of the packaged goods (fragility, size, weight etc.), all influences within the chain (packing – transport – storage – unpacking – and possibly the onward chain to the customer) must be considered in terms of the load imposed on the packaging and the packaged goods.

When selecting packaging methods, packing equipment and packing materials, the legal provisions governing packaging in the countries of delivery and of destination must be observed. For Germany, this includes, in particular, the legislation on packaging and possibly also the legislation governing waste. Particular attention must be paid to aspects relating to the avoidance of excess packaging material and its reuse or recycling.

Reusable packaging is to be preferred.

Cooperation with packaging specialists is recommended when defining the packaging.

The items are packaged into packing units based on the specifications issued by ASMPT. Painted and electroplated parts must be packaged in such a way that items cannot damage one another (except in the case of bulk goods).

Corresponding packaging instructions must be sent to ASMPT together with the documents for initial sampling Ideally, this should be coordinated with the responsible department at ASMPT. In all cases, it is the supplier’s responsibility to ensure a common understanding of the packaging requirements and the other logistical constraints before the first series delivery

A template and an example of a packaging data sheet can be found on the ASMPT homepage.

9.6.2. Applicable regulations, guidelines and standards

These regulations, guidelines and standards only constitute a basis for the definitive instructions. In special cases, the additional instructions contained in these documents must also be observed.

ISO 21067-1	Packaging — Vocabulary — Part 1: General terms
ISO 21067-2	Packaging — Vocabulary — Part 2: Packaging and the environment terms
ISO 780	Packaging – Distribution packaging; Graphical symbols for handling and storage of packages
ISO 4180	Packaging -- Complete, filled transport packages; General rules for the compilation of performance test schedules

EN 61340-5 Electrostatics - Part 5; Protection of electronic devices from electrostatic phenomena

9.6.3. Initial sample inspection of packaging

The inspection of the packaging forms part of the initial sample inspection of the ordered item.

The packaging must be applied appropriately in the light of the fragility of the transported goods.

The supplier will examine the requirements placed on the packaging in compliance with the packaging standard (e.g. fall test, climatic test, shock test, pressure test etc.) or provide evidence of compliance of the material and enclose corresponding confirmation with the initial sample inspection report.

The supplier must consult with the ASMPT Source Team regarding the principles underlying the packaging.

The final inspection operation must include a visual inspection of the packaging and a functional test of the packaged goods.

Proof of RoHS conformity must be provided if required.

9.7. Product labeling

The labeling of components and assemblies ensures their identification and traceability.

These general requirements for labeling are considered to be basic definitions. The technical documentation (e.g. the drawing) will usually contain references to these general requirements. The location of and the maximum space available for the labeling are also specified in the technical documentation

Generally, products should only be labeled when the final test has been successfully completed This ensures that defective parts can be identified and sorted out more easily.

9.7.1. General requirements

General requirements

Labeling methods: Adhesive label, print, engraving, laser marking, stamping, etching, eroding, other methods as agreed with ASMPT.

- Permanent attachment to substrate
- Abrasion resistance of the labeling
- Functional impairments must be excluded.
- Excellent resistance against solvents and contamination
- Temperature resistance in the range of -20°C to +70°C
- Non-conductive labels on electric assemblies
- Labeling should be visible in the installed condition, if possible
- Labeling should be legible even after surface treatment (if necessary, only apply labeling after surface treatment)
- Font: Helvetica or Arial; other fonts to be agreed with ASMPT
- Character size: minimum 1.5 mm (font size 5 pts.)
- Single line spacing
- Alignment: centered

9.7.2. Requirements placed on label markings

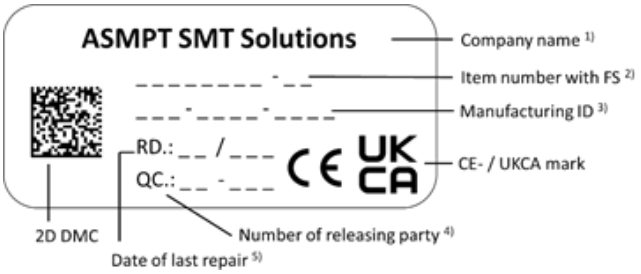
- Acrylate or butyl adhesive for labels
- Adhesive type as per DIN 30646: PNS (permanent adhesive, low temperature adhesive, special adhesive)
- Bonding force level T (≥ 25 N/25mm) as per DIN 30646, measured after at least 48 hours of storage in a normal climate 23/50, DIN 50014 on tensile test machine DIN 51221.
- The label size on the packaging should be not more than 90 x 60 mm
- The label size on the modules should be not more than 40 x 30 mm
- Label background color: white
- Font color: black

9.7.3. Labeling design

9.7.3.1. General requirements

For reasons of traceability, a marking consisting of plain text information and 2D code is required for selected components and assemblies. The requirement for ASMPT-specific labeling and the positioning of the labeling can be found in the respective order documents (e.g. drawings) for the component or assembly.

With regard to the content / structure of the labels to be affixed, the following requirements apply:



re. 1): Company name “ASMPT SMT Solutions” (abbreviated to: “ASMPT” if there is not enough space). re. 2): The item number with FS (functional version) must be taken from the manufacturing documentation. re. 3): The manufacturing ID, consisting of:

- Block 1: Manufacturer code specified by Purchasing
- Block 2: Alphanumerical date codes defined in Section 9.7.4
- Block 3: Serial/sequential number must be specified.

re. 4): ID of releasing QC party (optional: on specific request only)

re. 5): Date of last repair in plain text (example: 03/2018) (optional: on specific request only)

A CE mark on the label is only required if it is relevant for the product (Machinery Directive, Low Voltage Directive, etc.).

With regard to the production identification number, the following applies to the interdependency of the date specification (block 2) and the serial number specification (block 3):

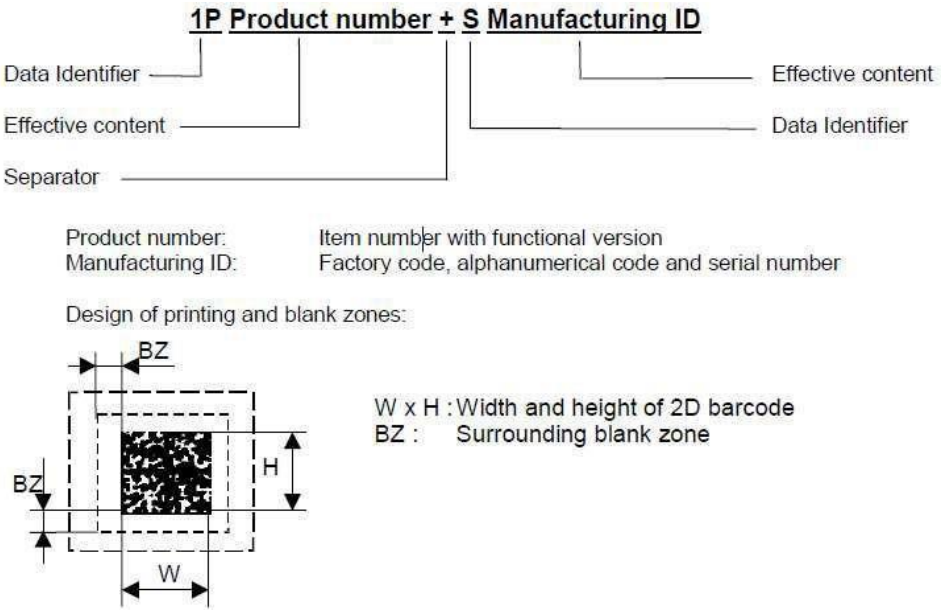
- Date available: Serial number sequential beyond end of month.
- Date not available: Serial number starts at 0 on every new month.

If there is very little space available, a reduced content (company name and 2D code) can be included following consultation with ASMPT or or if this is defined accordingly in the order documents.

Implementation of the 2D code:

The 2D coding must be implemented as DataMatrix ECC 200 according to ISO/EN 16022.

The data string of the code has the following information content (without spaces):



The blank zone (BZ) must be implemented as a function of the barcode resolution (X) as ≥ 2X.

The resolution is determined by the application and must be appropriate for the labeling and reading technology used. The resolution according to ISO/IEC 16022 is X ≥ 0.25mm. Higher resolutions are possible but must be tested for legibility by the ordering party.

The width (W) and height (H) of the barcode depend on the resolution (X) and the number of characters in the data string. This results, e.g., in the following:

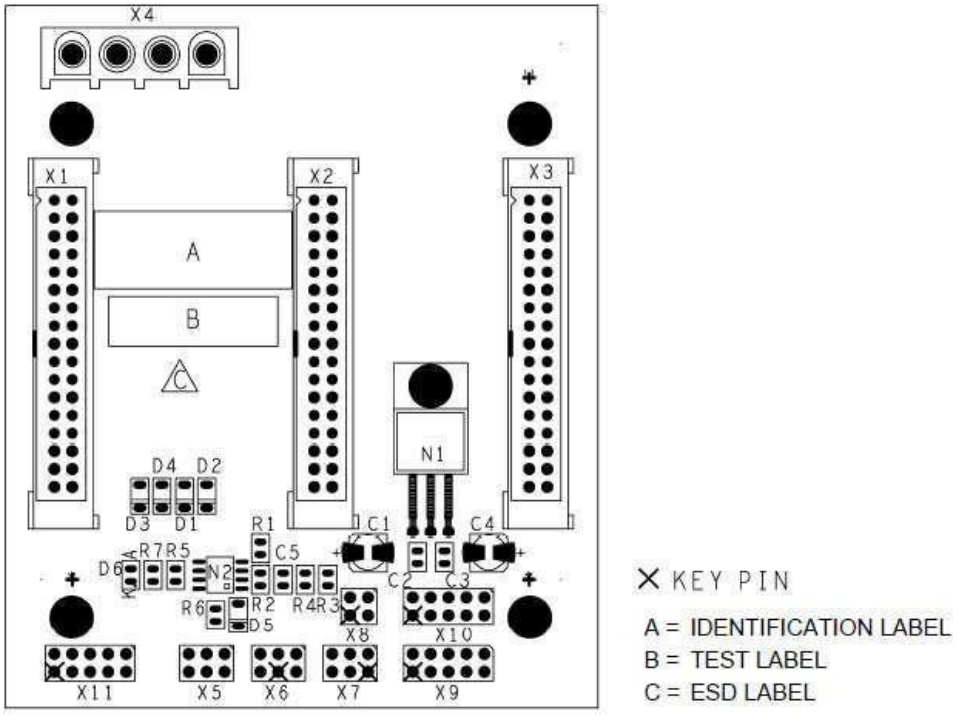
- at a resolution of 6 dots and 53 characters, a barcode size of 6.6 mm
- at a resolution of 4 dots and 53 characters, a barcode size of 4.4mm
- at a resolution of 4 dots and 15 characters, a barcode size of 2.4mm

9.7.3.2. Electrical/electronic assemblies (printed circuit boards)

Labeling methods:

For the entire assembly:Adhesive label

For the board: Print, engraving, laser printing, in Cu (in layout); other methods as agreed with ASMPT. The location of the labeling is specified in the component mounting diagram (see example below).
The UR logo, the manufacturer logo, the board type and the flammability class according to UL 94 must be etched on the board as part of the layout.



The locations of the labeling are defined in the board's component mounting diagram. Each location is identified with a letter code (A, B, C) and an outline.

If the space is extremely constrained, the contents may be distributed among several locations (partial labeling B_1 to B_n).

Externally developed standard printed circuit boards

re. 1): Company name "ASMPT SMT Solutions" (abbreviated to: "ASMPT" if there is not enough space). re. 2): The item number with FS (functional version) must be taken from the manufacturing documentation.

In addition to the labeling shown, the supplier must label these products with its manufacturer name or manufacturer code, type designation, serial number and/or the manufacturing date.

9.7.3.3. Preassembled cables, wires and pneumatic lines

Attaching labels to cables:

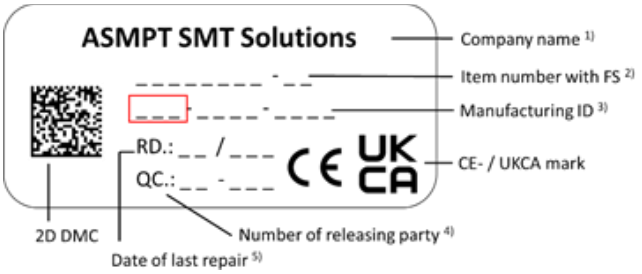
As a rule, labels must be attached to both ends of the cable. For cables of less than 200mm in length, one label located in the middle and showing both connector designations is sufficient

The labeling must always be fully legible after being affixed to the cable. In the case of very thin cables (e.g. individual conductors), the label must be attached in the form of a tag and the transparent part of the label must be stuck over the labeling field.

The requirements concerning preassembly and the required identification features with respect to cables, lines, connectors and wiring are specified in the order documentation.

Unless otherwise specified in the order documentation, the labels are to be attached in the following locations:

- stripped cables: on the jacket, 20-30 mm away from the end of the jacket
- on ribbon cables: on the cable, 20-30 mm away from the connector



re. 3): The connector designation from the item's product-specific documents must be specified in the block marked in red. The connector designation is omitted for cable ends without a mounted connector.

Alternative marking (without label):

As an alternative to labels, markings on the cable jacket, on individual conductors, on ribbon cables and on connectors are also permissible. The general requirements such as legibility, resistance to abrasion and resistance to solvents and contamination must be met. Such markings must not cause any damage.

Marking sequence / location:

Markings on cable jack:

The connector designations must be located next to the corresponding jack, followed by the company name (abbreviated form: "ASMPT"), the item number with functional version (FS), the manufacturer ID and the manufacturing date (coded). The individual indications must be separated by underscores.

Example: **x5rh_ASMPT_03001234-01_XXX_RO30**

Position of the markings:
Approx. 10mm from the cable jack, towards the outside, not covered by cable ties, for example, easily legible, centered.

Markings on individual conductors:

The connector/PIN designations must be located next to the corresponding connector, followed by the company name, the item number with functional version (FS), the manufacturer ID and the manufacturing date (coded). The individual indications must be separated by underscores.

Example: **x5rh_ASMPT_03001234-01_XXX_RO30**

If the identification of the item number together with the functional version (FS), the manufacturer and the manufacturing date is ensured by the labeling on the assembly (e.g. in the case of cable ducts, wiring harnesses), then this marking can be omitted.

Position of the markings:
Approx. 20mm from the end of the connector and line, outside of the cable ties and easily legible in the assembled state.

Markings on ribbon cables:

Markings made directly on ribbon cables must be applied in compliance with the contents of the labels.

Connector markings:

When the product-specific documentation calls for connector markings directly on the connector, these must meet the requirements in terms of, for example, legibility, resistance to abrasion and resistance to solvents and contamination.

The design of the marking is at the discretion of the supplier.

Pneumatic lines:

The same provisions that apply to cables also apply to the labeling of pneumatic lines.

9.7.4. Coding of manufacturing date

Table 1: Year of manufacture

Calendar year	Code [1]
1990, 2010, 2030	A
1991, 2011, 2031	B
1992, 2012, 2032	C
1993, 2013, 2033	D
1994, 2014, 2034	E
1995, 2015, 2035	F
1996, 2016, 2036	H [2]
1997, 2017, 2037	J
1998, 2018, 2038	K
1999, 2019, 2039	L
2000, 2020, 2040	M
2001, 2021, 2041	N
2002, 2022, 2042	P
2003, 2023, 2043	R
2004, 2024, 2044	S
2005, 2025, 2045	T
2006, 2026, 2046	U
2007, 2027, 2047	V
2008, 2028, 2048	W
2009, 2029, 2049	X

[1] Complies with IEC 60062
[2] The letter G is prohibited for new applications because it does not comply with DIN EN 60062. It is only used for retro-coding.

Table 2: Month of Manufacture

Month	Code [1]
January	1
February	2
March	3
April	4
May	5
June	6
July	7
August	8
September	9
October	O ("Oh")
November	N
December	D

Table 3: Day of manufacture

Day of Month	Code
1st to 31st day	01 through 31

Examples:	Year/Month/Day
5th May 2001	N505
31st December 2013:	DD31
15th August 2019:	L815
5th May 2021:	N505
1st October 2033:	DO01

9.7.5. Labeling on packaging

Deliveries must be adequately labeled to enable their unambiguous assignment to the associated delivery documents. The delivery documents must contain information about the supplied material together with the underlying orders and associated order numbers.

The labeling and identification of the packaging itself (here: outer or transport packaging) must include the standardized pictorial markings that are specified in standard ISO 780 as appropriate (e.g. Fragile / Delicate, Goods, Up, Protect against humidity, ESD, prescribed transport etc.).

Requirement according to:

ISO 780- Distribution packaging - Graphical symbols for handling and storage of packages

The packaged goods must be identified by means of the nameplate.

9.7.5.1. Packaging of magnetic material

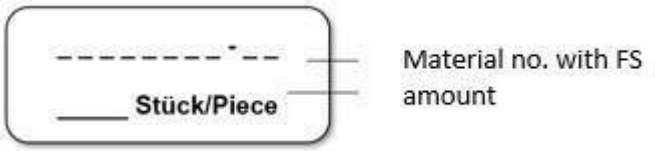
The packaging of magnetic material with magnetic force greater than or equal to 50N must possess a warning sticker which refers to the possible dangers in handling magnets.

Example of labeling:

9.7.5.2. Packaging subunits

If not expressly specified by ASMPT, packaging subunits defined by the supplier must be marked with the ASMPT item number and the packing quantity.

The delivery volume must be divided into equal subsets.



9.7.5.3. Barcode labeling

[Should be adapted to the actual requirements]

ASMPT strongly encourages suppliers to implement 2D barcode labeling on their packaging

Design requirements

Standard layout:

The 2D coding must be implemented as DataMatrix ECC 200 according to ISO/EN 16022.

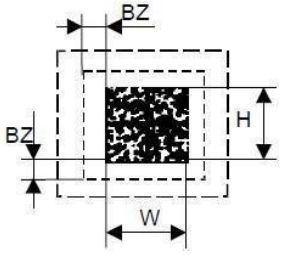
The data string of the code has the following information content

230120_12345678-01+123456_1234567890= total of 36 characters

Order number – 10-digit
Delivery volume – 6-digit
Item number with manufacturing status – 11-digit
Production date (ddmmyy) – 6-digit

Item no.: Item number with functional version
Manufacturing ID: Factory code, alphanumerical code and serial number

Design of printing and blank zones:



W x H: Width and height of 2D barcode

BZ: Surrounding blank zone

The blank zone BZ must be designed as a function of the barcode resolution X as ≥ 2X

The resolution is determined by the application and must be appropriate for the labeling and reading technology used. The resolution according to ISO/EN 16022 is X ≥ 0.25 mm. Higher resolutions are possible but are subject to legibility testing by the customer.

The Width W and Height H of the barcode depend on the resolution X and the number of characters in the data string. This results, for example, in the following:

9.8. Guidelines on ecologically responsible product design

9.8.1. Procurement and production aspects

- Minimize production waste by means of appropriate product design.
- Take account of environmental aspects when selecting or procuring semi-finished products, components and OEM products
- Comply with legal bans and restrictions as well as with the list of substances to be avoided when selecting material and components
- Avoid the use of hazardous materials in the manufacturing of products
- Minimize energy consumption during manufacturing
- Obtain information on the environmentally relevant properties of the semi-finished products, components and OEM-products
- Minimize the amount of packaging (weight, volume)
- Optimize the environmental compatibility of the packaging in terms of the selection of materials and logistics:
- Conflict minerals: Take account of the current legislation.

9.8.2. Product use aspects

- Minimize energy consumption during standby or operation
- Minimize consumption of operating materials
- Exclude the possibility of harm to the environment or health during product use
- Draw attention to operating methods that conserve resources (energy, water, etc.);
- Draw attention to the environmentally responsible disposal of consumables (batteries, toner, etc.)

9.8.3. Prohibited substances and substances requiring declaration

A current overview of prohibited substances and substances requiring declaration can be found on the ASMPT homepage under Suppliers (“List of restricted and declarable substances”).

All products must comply with these requirements.

The supplier must inform ASMPT immediately if one of the indicated limit values is exceeded, or recourse is made to a special exemption.

In particular, the supplier must fulfill its duty to supply information according to the “Candidate List” set out in Guideline 1907/2006 EC (Reach regulation). There is an obligation to provide information relating to the materials present on this list.

The products must correspond to the requirements of the directive on the restriction of the use of dangerous materials (RoHS).

10. Definition of terms and abbreviations

ANSI	American National Standards Institute
AOI	Automatic Optical Inspection
Cp	Process capability index to describe the variation of a manufacturing process.
Cpk	Process capability index that also considers the position of the mean value of the frequency distribution in relation to the specification limits, in addition to the variation of a manufacturing process.
dpm	Defects per million
ES	Product version as part of the ASMPT drawing number
ESD	Electrostatic sensitive device
FPY	“First Pass Yield” Percentage of assemblies in the manufacturing process that have passed all tests without any reworking
FMEA	Failure Mode and Effects Analysis
FCT	Functional Test
FPT	Flying Probe Test
FS	Functional version as part of the material number of the module or single part
FTA	Fault Tree Analysis
ICT	In-Circuit Test
IEC	International Electrotechnical Commission
IPC	Formerly “Institute for Printed Circuits”. Now IPC-Association Connecting Electronics Industries
J-STD	Joint industry standard
JTAG	Joint Test Action Group
LH/PH	Requirement specification / Functional specification
Mch	Munich / Germany
MCT	Maturity Capability Test
ASMPT	ASMPT SMT Solutions
SPC	Statistical Process Control
SPI	Solder Paste Inspection
PCB	Printed Circuit Board
Assembled PCB	
ppm	Parts per million
QM	Quality management
QAA	Quality assurance agreement to ensure the quality of supplies
TCOD	Technical Conditions for Orders and Deliveries
UL	Underwriters Laboratories Inc. (relevant standards organization for the North American market)
US	Documentation version as part of the ASMPT drawing number
VBG4	Directives of the German statutory industrial accident insurance institution
VDA	Association of German Automobile Manufacturers
VDE	Association of German Electrical Engineers
VDG	Association of German Foundry Experts

11. Annexes

11.1. Download of forms and other documents

All forms are available for download at: https://smt.asmpt.com/en/company/suppliers/

The forms are always available in the language selected.

11.2. Overview of email contact addresses

ASMPT GmbH & Co. KG Munich, Germany

Prototypes Cover sheet, dimension report, material certificate, etc.	prototypen.sqmch@asmpt.com
Initial samples Cover sheet, dimension report, material certificate, etc.	empb.sqmch@asmpt.com
Complaints 8D report, pictures, 5Why, etc.	maengel.sqmch@asmpt.com

ASMPT SMT Singapore Pte. Ltd., Singapore

Prototypes Cover sheet, dimension report, material certificate, etc.	Contact respective SQ
Initial samples Cover sheet, dimension report, material certificate, etc.	Contact respective SQ
Complaints 8D report, pictures, 5Why, etc.	Contact respective SQ

ASMPT SMT UK Ltd. Weymouth, United Kingdom

Prototypes Cover sheet, dimension report, material certificate, etc.	uksupplierquality@asmpt.com
Initial samples Cover sheet, dimension report, material certificate, etc.	uksupplierquality@asmpt.com
Complaints 8D report, pictures, 5Why, etc.	uksupplierquality@asmpt.com

Postscript:

The preparation of the “Technical Conditions for Orders and Deliveries” (TCOD) – Quality Requirements is based on contributions from employees from different departments of ASMPT SMT Solutions.

No claim is made in respect of the completeness of the present TCOD, which reflect the available knowledge at the time of preparation.

If changes occur to standards or legal provisions, these must be taken into account accordingly.

Standards or legal provisions that have not been considered shall nevertheless form the basis for the provision of deliveries and services. We kindly request our suppliers to notify us of such developments.

The “Technical Conditions for Orders and Deliveries” will be revised and published in a new version as soon as an adequate number of change proposals have been accumulated. We welcome suggestions from our suppliers.

Issued by:

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