Axcelis Quality & Business Requirements to Suppliers

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1 Purpose

This document defines the requirements and expectations of products or services provided by suppliers and sub-tier suppliers to Axcelis Technologies, Inc., referred to as “Axcelis” from this point forward in this document.

This document is meant to also provide examples of tools/methods for quality process improvements, and certain sections of this document may not necessarily be applicable in some cases.

Meeting the minimum requirements outlined in this document in no way relieves the supplier of contractual responsibilities to provide products conforming to Axcelis specifications and requirements nor is there relief from acceptance requirements and warranty obligations as agreed upon in the Axcelis Purchase Order terms and conditions or signed agreement.

1.1 Conflicts

In the event of document conflicts, the Axcelis Purchase Order terms and conditions or signed agreement will prevail over this document.

1.2 Axcelis Quality Policy

Axcelis has established a Quality Policy to ensure that customer requirements are determined and are met with the intent of enhancing customer satisfaction. It is expected that suppliers understand and support this Quality Policy.

To meet or exceed customer expectations by:

- Understanding our customers product and service requirements.
- Taking action to design and develop products and achieve our customers expected results in a timely manner.
- Involving our employees in continual improvement of our products, services, and processes.
- Creating a culture that internalizes Axcelis values and promotes a safe working environment.

2 Documents and Definitions

2.1 Axcelis Reference Documents (as applicable, make sure you are using the most recent version):

NON-DISCLOSURE AGREEMENT (NDA)

PURCHASE ORDER TERMS & CONDITIONS

SUPPLIER PRE-ASSESSMENT FORM

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STOCKING AGREEMENT

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HELICOIL INSR INSTL SPEC

O-RING SURFACE SPEC

PROC ELECTROSTATIC POWDER COAT SPECIFICATION

STEEL AND SHEETMETAL MANUFACTURING GUIDE

SPECIFICATION FOR ALUMINUM VACUUM COMPONENTS

SPEC ALUMINUM 6061-T6 TYPE SELECTION

SPECIFICATION FOR GRAPHITE COMPONENTS

SPECIFICATION FOR REFRACTORY METAL COMPONENTS

SPEC PCB ASSEMBLY MARKING

TEST SPEC POST-SOLDER X-RAY INSPECTION REQUIREMENT

HARNESS CABLES WORKMANSHIP STANDARD

TEST SPECIFICATION FOR CABLE HARNESS

SPEC LBL ELECT/FIBER OPTIC/POLY HARNESSES/CABLES

OTHER DOCUMENTS AND SPECIFICATIONS AS LISTED IN AXCELIS DRAWINGS

2.2 Definitions

ADR – Advance Deviation Request

Process Control Plan – Documented description (standard work) of the systems, processes and activities required for controlling the manufacturing of a product.

A process control plan is applicable, as appropriate, for:

a. Prototype: a description of the dimensional measurements, material, and performance tests that will occur during building of the prototype. The organization shall have a prototype control plan, if required by the customer.

b. Production: documentation of product/process characteristics, process controls, tests and measurement systems that occur during mass production.

Counterfeit - unauthorized representation of a registered trademark carried on goods identical or similar to goods for which the trademark is registered, with a view to deceiving the purchaser into believing that he/she is buying the original good.

FMEA - a systemized group of activities intended to: Recognize and evaluate the potential failure of a product/process and its effects; identify actions which could eliminate or reduce the chance of the potential failure occurring; and document the process. It is complementary to the process of defining what a design or process must do to satisfy the customer by the usage of risk based thinking.

FAI – First Article Inspection, a detailed inspection process utilized to verify conformance of a component during initial production run, or process change.

FOD - The FOD acronym is interchangeably used to define Foreign Object Debris, Foreign Object Damage and Foreign Object Detection.

Gauge R&R – Gauge Repeatability and Reproducibility Study, an analysis to determine the amount of variation that will be produced from the main two contributors of a measurement system: the gauge/test equipment (repeatability) and the operator (reproducibility).

Incoterms (Incoterms 2010) – published by the International Chamber of Commerce; Incoterm rules provide internationally accepted definitions and rules of interpretation for most common commercial terms. Incoterms 2010 refers to the most recent revision of these rules released in 2010.

Material Testing/Verification Report – a quality assurance document that certifies compliance to specifications and industry standards.

MPP – Manufacturing Process Plan, a brief description of each manufacturing process by operation in chronological order

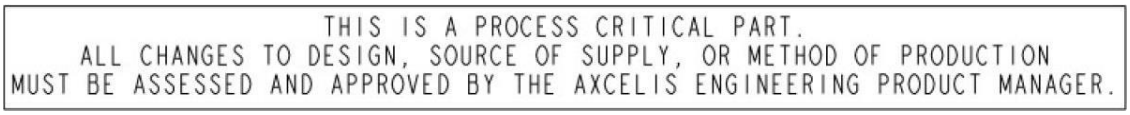
MRB – Material Review Board

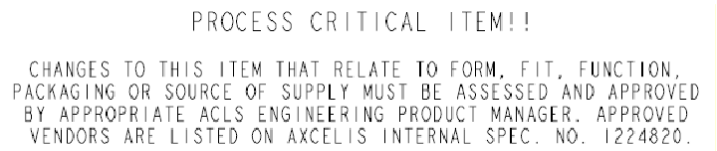
NCM – Non-Conforming Materials, materials, parts, or components that do not meet the required specification as defined by engineering drawings and other technical documentation.

NPI – New Product Introduction

Obsolescence Diminishing Manufacturing Sources and Material Shortages (DMSMS) as the service life of a product extends beyond the technology life cycle incorporated in the design

PCI – Process Critical Items. Parts and assemblies that have been identified as critical in the processing of wafers. All changes to design, source of supply, or method of production must be assessed and approved by Axcelis. All PCI are identified by either of these notes in the drawings:





PPAP – Production Part Approval Process is the industry standard that ensures engineering design and product specification requirements are met. Through the PPAP guideline, suppliers and customers understand the requirements to obtain part approval of supplier manufactured parts.

PSW – Part Submission Warrant is the documented evidence of a First Article Inspection Report or change management.

SCAR – Supplier Corrective Action Report using 8D methodology.

Shall – The word “shall” indicates a mandatory requirement

Should – The word “should” indicates a recommendation

Special Characteristic – Features that are critical to quality and performance and are not allowed to have a deviation of have a deviation from specifications. These features are identified on drawings with the symbol. 

Sub-Tier Supplier – Providers of production materials, production, finishing services or assemblies directly to any Axcelis’ supplier

Supplier – Providers of production materials, production, finishing services or assemblies directly to Axcelis or Axcelis’ customers

Validation - Validation shall be performed in accordance with planned arrangements to ensure that the resulting product/system is capable of meeting the requirements for the specified application or intended use, where known. Wherever practicable, validation shall be completed prior to the delivery or implementation of the product/system. Records of the results of validation and any necessary actions shall be maintained (production part (first article) and process are the means to provide a product/system validation).

Verification - Verification shall be performed in accordance with planned arrangements to ensure that the design and development outputs have met the design and development input requirements. Records of the results of the verification and any necessary actions shall be maintained (modeling, simulation and prototype are the means to provide design verification)

8D (Eight Disciplines Problem Solving) – A method to identify, correct, and eliminate recurring problems that is also useful in product and process improvement.

5Why Analysis – A problem solving analysis technique to quickly find the root cause of an anomaly or a product/process non-conformity

3 Supplier Quality Requirements

3.1 Needs and Expectations

1. Demonstrate that the practices being utilized to provide products or services meet the requirements as outlined in this document, where applicable.
2. Maintain a functional and documented Quality Management System (QMS) that meets the requirements of ISO Standards for which our vendors carry out and are certified to including ISO 9001, ISO 13485, IATF16949 and AS9100, and that address all stages of production, process control, design and development, manufacturing, delivery and post-delivery activities. This requirement may be waived

for strategic business purposes, if approved by our VP of Quality and/or VP of Supply Chain. Where this requirement can't be met, the supplier shall document actual Quality practices and provide it to Axcelis in writing when requested. Axcelis reserves the right to review/assess the QMS including product & service development processes, as well as manufacturing and process control plans applied to products and/or services.

Suppliers should comply as follows:

a. Create and maintain current documentation that reflects process flow, work instructions, quality performance, and production schedules as applicable to ensure component/service quality, cost and delivery.

b. Maintain policies and procedures on sub-tier supplier selection, approval and performance monitoring process that ensures conformance to Axcelis requirements as described in Section 3.2.

c. Communicate any changes to the QMS or process control plan that could affect planned outcomes to Axcelis.

PROCESS CONTROL PLAN FORM

d. Maintain a structured problem-solving process per Section 3.5

e. Maintain an accurate and functional change control system that complies with Axcelis requirements as outlined in Section 3.6.

f. Conduct internal quality audits using accepted methods of measurement or use impartial third-party quality audits that ensure compliance with the Axcelis requirements and industry standards.

g. Supplier should, as applicable, create a plan with timeline to implement any of the above elements (a) to (f) that are currently not available.

3. Supplier shall adhere to Axcelis engineering prints, material specifications, applicable specifications and/or reliability requirements that apply to the commodity or specific part being purchased.

a. Ensure product is quoted, built and inspected 100% to the revision of the drawings and requirements that are specified by the Purchase Order.

b. Fully review all the listed documents per Section 2 and contact Axcelis Purchasing representative to obtain a copy of the latest revision of documents or additional documents being called out in any of the Axcelis documents.

c. Ensure all documentation needed for production and quality assurance is in the language understood by the Supplier's production and quality team members and is available in English if they must be reviewed by Axcelis.

d. Accuracy of 3D models are not maintained by Axcelis, unless specified otherwise, and must not be used without ensuring product is built and inspected 100% to the 2D drawing.

e. Compliance to Standard ASME Y14.5 or equivalent Geometrical Product Specification.

Supplier shall comply with industry standards explicitly called out in specifications and in the Good Manufacturing Practices document below:

GOOD MANUFACTURING PRACTICES MANUAL PROCEDURE

Allow onsite audits as requested by Axcelis (this includes sub-tier suppliers). Axcelis will provide advance notice

Participate in design for manufacturability (DFM) and cost-out activities in partnership with Axcelis, as requested.

Supplier has a process to control and prevent (and inspect for) applicable fraudulent/counterfeit electronic parts and agrees to flow down to its sub-tier suppliers. If the supplier is not a fully authorized Franchised Distributor of the OEM, then a C of C (Certificate of Compliance) or a C of A (Certificate of Authenticity) must be provided to Axcelis with each shipment.

3.2 Sub-Tier Supplier Management

All Axcelis suppliers should maintain a sub-tier supplier selection and approval process supported by appropriate documentation available for review by Axcelis. This process should have defined criteria including but not limited to previous experience, safety, quality, performance, schedule, cost, intellectual property, risk, and commitment with the intent to ensure product or service conformance to Axcelis requirements. There should also be a documented sub-tier supplier monitoring process with appropriate documentation available for review by Axcelis.

Any changes to sub-tier suppliers of PCI shall be communicated to Axcelis.

Supplier should create a plan with timeline to implement any of the above sub-tier supplier management elements that are currently not available, if requested by Axcelis.

3.3 Supplier Control and Flow Down

Each supplier to Axcelis is required to ensure that sub-tier suppliers receive the flow-down of relevant product specifications and requirements, protected by an NDA. Appropriately, sub-tier suppliers are required to apply the same process control requirements.

Any changes to the supplier's sub-tier manufacturing processes, including but not limited to special processes such as welding, brazing, plating, heat treatment, painting, coating, finishing and non-destructive test shall be brought to the attention of the supplier for review and approval prior to incorporation. All such changes shall be communicated to Axcelis for PCI.

3.4 Product and Process Assessment

Axcelis reserves the right to conduct periodic assessments of work products (deliverables, reports, analysis) and to verify compliance as well as product and process performance. All suppliers should maintain records in accordance with this plan and with Section 3.9.

Axcelis reserves the right to conduct an audit, source inspection or assessment of any work products of the project at the supplier's facility or work sites. Any deficiencies or non-conformances noted during the assessments shall be documented and tracked to closure appropriately. An 8D may be required as described in Section 5.

3.5 Corrective and Preventive Action

The supplier shall employ a closed–loop Corrective Action system (5Why Analysis, 8D method or similar) to correct non-conformances, systemic quality issues and/or prevent non-conformances and to implement continual improvement. This process shall include Root Cause Analysis and implementation of corrective/preventive actions. Verification and validation shall be done to confirm compliance to the improvement plan and effectiveness of the incorporated actions. Lessons learned should be incorporated and communicated for problem prevention.

PRC SUPPLIER CORRECTIVE ACTION REPORT FORM

3.6 Change Management

The supplier shall maintain a documented change management process. This process shall ensure that current revisions of all documents, product specifications, and quality/production processes are available to relevant personnel. All previous revisions of such documents shall be collected and appropriately stored or destroyed to prevent use of incorrect documentation in planning and production.

In the event of Axcelis-approved or issued design changes while in production, the supplier shall identify the point of cut-in for the changes by component serial number, batch/lot number, or purchase order line-item number, as applicable. This cut-in point shall be submitted to and agreed upon with Axcelis prior to the implementation of the design changes.

3.7 Calibration Management

The supplier shall maintain a documented calibration program for tooling, gauges, inspection instruments and other applicable equipment. This program should at minimum include tracking of a calibration schedule (including expiration dates), identification of calibrated tools and equipment, active removal of tools and equipment from service after expiration, and traceability to national or international standards such as NIST, NORAMET, EURAMET or other recognized standards laboratories.

3.8 Continual Improvement

It is expected that suppliers should employ a continual improvement process utilizing appropriate methods such as lean management, problem solving, problem prevention, etc. Continual improvement activities should focus on meeting customer requirements and targets for safety, quality, time and cost as well as achieving performance targets. The supplier shall provide a written continual improvement plan if requested by Axcelis.

3.9 Data and Record Retention

Suppliers should ensure that project records, specifications, manufacturing methods, test plans, certificates of compliance, and quality records are maintained and available for review upon request for a minimum period of 5 years.

All records should be appropriately organized and stored with a redundant back-up system. A written records retention plan should be available for Axcelis review, if requested.

4 Initial Supplier Evaluation and Approval Process

All suppliers shall be approved for a specific work scope or deliverable through an objective assessment process. The assessment and subsequent selection process will be performed by Axcelis or its designee. The reasons for non-selection / approval may be provided upon request.

The supplier selection process should begin with the completion of the NDA, Supplier Pre-Assessment Survey and Quality Supplier Assessment Form, as applicable. The supplier must complete and return the completed forms to Axcelis to be considered. All information provided in the forms shall be true and accurate to the best of the supplier's knowledge.

An on-site assessment will then be completed by an Axcelis team, if deemed necessary. This assessment is intended to provide Axcelis with an introduction to the supplier, supplier facility, production capability and processes, EHS management system, and QMS. The assessment typically requires the team to be on-site for minimum 1 day and will be scheduled in advance with the supplier.

Following the completion of the on-site assessment, Axcelis will review all necessary information including the assessment results and performance in the case of existing supplier. Information included in the decision process includes but is not limited to supplier quotations, supplier terms and conditions, and results of all assessments performed.

After a supplier has been approved for the specific work scope or deliverable, a First Article purchase order shall be issued. The execution of the purchase order shall be considered an authorization to proceed with manufacturing activities. No manufacturing activities (including the purchase of raw materials or tooling) shall take place prior to the issuance of a purchase order unless specifically directed by Axcelis through a signed agreement.

Distributors

• If distributor has no ownership nexus with the actual manufacturer, and part / product supplied as produced by the manufacturer specifications, then the distributor is considered a Catalog Supplier and qualified accordingly.

• If distributor is also the manufacturer, then they shall be considered a Direct Material supplier and qualified as Direct Material supplier.

• If part or product purchased via distributor is produced by the actual manufacturer based on Axcelis specifications, then the actual manufacturer shall be qualified as a Direct Material supplier.

Reference documents:

NON-DISCLOSURE AGREEMENT

SUPPLIER PRE-ASSESSMENT SURVEY

QUALITY SUPPLIER ASSESSMENT FORM

PURCHASE ORDER TERMS & CONDITIONS

STOCKING AGREEMENT

5 Pre-Production Activities

5.1 Pre-Production Readiness Review

Axcelis may choose to conduct readiness reviews or process assessments to verify planned outcomes are achieved, prior to the start of production. The readiness review is separate from the on-site assessment performed during the supplier selection and approval process; the pre-production readiness review is intended to be a more in-depth examination of the supplier's quality management system, work processes, and ability to consistently meet required quality levels.

The readiness review will be performed at the discretion of Axcelis. Axcelis Quality and/or Procurement reserves the right to waive this requirement.

The supplier pre-production readiness review may be accomplished in two phases: a desk review of associated documents, procedures, work instructions, etc. and an on-site assessment for implementation verification. Axcelis may provide a document request to the supplier to facilitate a desk review.

Every effort will be made to provide advance notice and coordinate such activities with the supplier.

5.2 Obsolescence Notification

Supplier shall provide advanced notice of any known / planned obsolescence to Axcelis, for any parts that directly affect Axcelis, within 14 calendar days of supplier's knowledge that the obsolescence is going to occur.

Requirements of notice from Supplier:

a. inform Axcelis of part #(s) affected,

b. inform Axcelis of any suggested replacement(s),

c. and/or provide Axcelis with a last time buy opportunity, as applicable

6 Part Qualification and Acceptance

6.1 Production Part Approval Process

The part qualification process is intended to ensure that a component as applicable, and noted on Purchase Order, meets Axcelis technical / performance requirements and will consistently meet these requirements. Axcelis will use a Production Part Approval Process, as described in Section 6.4, to define the processes used for production parts.

At the discretion of Axcelis, any or all the part qualification items may be reviewed onsite at the supplier facility as part of the Production Part Approval Process.

The Production Part Approval Process should be executed with parts produced by the actual production processes.

It is the responsibility of the supplier to contact Axcelis as requirements are completed and/or to address any difficulties in meeting the requirements prior to manufacturing a part.

6.2 Applicability of Production Part Approval Process

The Production Part Approval Process is only applicable to build-to-print components, and when noted on Purchase Order. Generally, off-the-shelf components will not undergo a formal Production Part Approval Process; however, Axcelis maintains the right to impose certain quality requirements on off-the-shelf component suppliers, if deemed necessary.

6.3 Prototype Parts

Prototype, or NPI parts are primarily used for design verification purposes. Prototype parts will not undergo a formal Production Part Approval Process, unless otherwise specified. Axcelis will provide specific acceptance requirements to the supplier for each prototype part and will actively participate in the verification of prototype parts. The Production Part Approval Process will apply when the prototype verification results are released for production at supplier site.

6.4 First Article and Serial Production Parts

All components, except for some off-the-shelf components, have minimum part validation requirements as listed in this section. Additional documentation may be requested on a case-by-case basis.

Axcelis may require a first article run of a set quantity of parts accompanied by all the requirements in this section. The quantity of the first article part will be defined in the purchase order. The requirement of the first article run is identified by purchase orders prefixed “G” or “GH”.

All parts manufactured during serial production should be manufactured under frozen process control plans (PCP), manufacturing production plans (MPP), and work instructions. Any changes made to the PCP, MPP, and work instructions during serial production that change any processes that can affect form, fit, or function shall be communicated to Axcelis for PCI.

PROCESS CONTROL PLAN FORM

6.4.1 Design Records and FMEA

Applicable only if the supplier has design responsibilities. OEMs should supply applicable documentation upon request.

The supplier should supply applicable design records (including engineering and/or shop drawings) for review by Axcelis. There may be several design review steps required during the design process that will be described in the contract documents. The supplier is required to participate in these design reviews at Axcelis request and to make applicable documentation available for these reviews. A preparatory checklist may be supplied by Axcelis to ensure the supplier is adequately prepared for the design review.

The supplier will (as applicable) use the FMEA as a preventive analytical technique tool to proactively measure cause and effects of potential failures to meet customer requirements during the design process. If necessary, Axcelis will partner with the supplier to support the FMEA activity.

Potential design failures will be prioritized using the FMEA and clearly identified to Axcelis with Risk Priority Number (RPN) ranking logic. The supplier documented FMEA RPN defines actions to be taken and detail steps taken that establish controls for prevention based on risk priority.

The FMEA is a living document and shall be revised as risk is added or removed or as changes are made to the product or process.

For those instances where Axcelis has design responsibility, we reserve the right not to share the FMEA with suppliers, but Axcelis may share a list of all key characteristics so they can be addressed on the supplier's FMEA and Process Control Plans, where applicable.

6.4.2 Manufacturing Production Plan

A Manufacturing Production Plan (MPP), as applicable and noted on Purchase Order, should provide a brief description of each manufacturing process by operation, in chronological order. The following is a detailed description of information the MPP should contain:

- Cover Sheet
    - Supplier name and address of manufacturing location
    - Applicable Axcelis assigned document number and revision level
    - Supplier internal document number, revision level and date
- Document List
    - Indicate all applicable Axcelis material/process specifications and revision levels, as well as all applicable Supplier process, quality, and testing instructions and revision levels
- Material Supplier List
    - Revision controlled listing of approved suppliers of all raw material, functional components, direct services and sub-suppliers, including item or service supplied, contact name, address and phone number
- Process Flow Diagrams
    - A complete process flow diagram(s) that clearly describes the production process steps and sequence beginning at material receipt through packaging and shipping, including operations performed by outside sources. Key characteristics will be clearly identified at different process steps where applicable.
    - A single process flow diagram may apply to a group or family of products that are produced by the same processes in the same sequence.

Axcelis reserves the right to request copies of all applicable supplier procedures, work instructions, quality inspection check sheet templates, and any other documentation applicable to the manufacturing and quality control of Axcelis components, particularly PCI.

6.4.3 Process FMEA

Where applicable and noted on Purchase Order, the supplier should use the PFMEA, as a preventive analytical technique tool to proactively measure cause and effects of potential failures in a product or a process. Potential manufacturing or process failures will be prioritized using the PFMEA and clearly identified to Axcelis with Risk Priority Number (RPN) ranking logic.

The supplier documented PFMEA RPN will identify the actions to be taken that establish controls for risk reduction based on RPN. The results of the PFMEA should be applied the Process Control Plan to ensure adequate controls are in place for production.

The PFMEA is a living document and shall be revised as risks are assessed or as changes are made to the product or process.

6.4.4 Process Control Plan

The PCP (Process Control Plan), as applicable for PCI, follows the PFMEA steps, and provides more details on how the potential issues are checked in the incoming quality, assembly and/or manufacturing process or during inspections of finished products.

The PCP should detail all manufacturing, inspection, and testing processes and procedures of the product or service. The documented PCP will describe the actions required at each phase of the processes that are required to successfully manufacture the Axcelis PCI. An acceptable PCP will provide a complete road map of a confirmed process, including monitoring and control methods that will ensure compliance to proven and tested manufacturing methods.

Information required in the PCP:

- Listing of all technical documents that govern the inspection or test activity (i.e., supplier documents, Axcelis specifications, industry codes/standards)
- Identification of the test or inspection criteria in an itemized listing. Each line item must identify what is to be inspected (to the characteristic level), inspection method, inspection frequency, inspection timing performed (where in the manufacturing process), who is to perform the inspection (e.g., Operator, Inspector, etc.), and the acceptance criteria.
- Specific attention must be paid to the control of key process parameters.
- Completion of each inspection and test will be accompanied by appropriate sign-off documentation. This documentation may be in the form of test reports, inspection reports, check sheets, or included on the manufacturing traveler.

The PCP is identified by part number/part family, revision level, and applicable Axcelis purchase order number. Axcelis Process Control Plan Form, or an equivalent, shall be used.

PROCESS CONTROL PLAN FORM

6.4.4 First Article Inspection

The supplier shall conduct and prepare a First Article (FA) and submit a Part Submission Warrant (PSW), where applicable and noted on Purchase Order and related documents for Axcelis review, per 999001218. The FA shall be emailed to Axcelis (FA@Axcelis.com) upon completion. A 100%-dimensional inspection is the default criteria for a first article inspection.

The requirement of the first article run is identified by purchase orders prefixed “G” or “GH”.

For high complexity FA material (GH prefixed PO), once the part or materials are completed per the purchase order, contract, and engineering drawing requirements, the supplier shall notify Axcelis that material is ready to ship. Axcelis shall review the components and related documentation to verify completion and conformity prior to taking delivery or authorizing shipment (dependent upon contractual Incoterms). The method for review of components

will be at the discretion of Axcelis and may include review of quality/manufacturing documents, on-site inspection, or any other method deemed applicable.

Additional requirements may be described in the drawings, specifications, supply agreement, or purchase order. Axcelis reserves the right to witness or participate in the FAI at the supplier's location.

AXCELIS SUPPLIER FIRST ARTICLE ACCEPTANCE PROCEDURE

AXCELIS PART SUBMISSION WARRANT FORM

6.4.5 Material Testing/Verification Reports

The supplier, or a national accredited/certified independent third party, may be required to supply specific material, performance and/or durability test results, as indicated in the drawing or related specifications. Actual results shall be compared with agreed upon specifications. Axcelis may require third party testing for certain components.

6.4.6 Gauge R&R

Gauge Reproducibility and Repeatability (Gauge R&R) studies, when requested, shall be conducted on all critical dimensions as well as for any deviating criteria observed during first article run to ensure capability of the supplier measurement system. The supplier shall identify all required gauge R&R studies in the PCP and confirm applicability with Axcelis.

Unless otherwise defined in drawings or specifications, a gauge R&R should be conducted by having 3 operators inspect 3 pieces 3 times each (quantity of operators, pieces, and trials listed are minimum requirements – quantities can vary on a case-by-case basis and may be specified by Axcelis). All pieces should be production pieces, the order of pieces presented to the operator should be random, and all pieces should be numbered but blind to the operators.

Whether reported as a percent of tolerance or a percent of process variation, the calculated gauge R&R statistic is interpreted as the following:

- 0-10%: Acceptable
- 10-30%: Marginal
- 30-100%: Unacceptable

Any gauge R&R statistic greater than 10% should require an 8D problem solving activity, or other RCCA mechanism, and report presented to Axcelis for review, as requested.

6.4.6.1 PCI Change Management

After part qualification of PCI, suppliers shall not make any changes without written notification and approval from Axcelis.

The scope of change management includes the supplier, sub-suppliers and the supplier's service providers and agents engaged in support of the manufacture of Axcelis product.

Changes are defined as any alteration in the product design, purchased parts, materials or services, manufacturing location, method of manufacture, testing, storage, packaging, preservation or delivery.

Changes include, but are not limited to:

- Change to MPP

- Correction of a discrepancy on a previously shipped part.
- Product modified by a change to engineering design records, specifications, or material through an Engineering Change Notice (ECN).
- Implementation of a previously approved alternate process, substitute material or optional tier supplier.
- Production from new or modified tools (except perishable tools), dies, molds, patterns, including additional or replacement tooling.
- Production following refurbishment or rearrangement of existing tooling or equipment.
- Production following any change in process or method of manufacture to include changes in lubricants, mold release agents, or other process solutions.
- Production from tooling and equipment transferred to a different plant location or from an additional plant location.
- Change of source for key subcontracted parts, materials or services (for example: heat treating, plating).
- Product re-released after the processes or tooling used for Axcelis product has been inactive for twenty-four months or more.
- As a result of the supplier request to suspend or delay shipment due to a sub-tier supplier quality non-conformance or non-compliance.
- Any other activity that will result in a change to the approved part qualification process.

Axcelis reserves the right to re-qualify the product due to permanent product changes resulting from design or specification revisions.

Supplier shall provide an updated part qualification documentation where applicable, for all approved changes.

All PCI are identified by either of these notes in the drawings:

THIS IS A PROCESS CRITICAL PART. ALL CHANGES TO DESIGN, SOURCE OF SUPPLY, OR METHOD OF PRODUCTION MUST BE ASSESSED AND APPROVED BY THE AXCELIS ENGINEERING PRODUCT MANAGER.

ADVANCE DEVIATION AND WAIVER FORM

6.5 Product Acceptance

Axcelis and its subcontractors shall verify that the goods and services provided are complete and 100% compliant with the engineering drawings, specifications, bill of materials, or statement of work as listed in Section 6 and in conformance at the time of delivery. This can be demonstrated through supplier's checklists, material certifications, Test & Inspection Reports, Certificates of Compliance/Conformance or equivalent to signify that the item(s) are complete and compliant to the requirements specified for the product.

Acceptance of components will be performed at the agreed upon delivery point, if required, according to contractual requirements and as per applicable purchase order or manufacturing agreement Incoterms. Inspection and acceptance by Axcelis in no way relieves the supplier of contractual responsibilities to provide products conforming

to Axcelis specifications and requirements nor is there relief from acceptance or warranty obligations as agreed upon in the signed manufacturing agreement or Axcelis standard terms and conditions. Axcelis reserves the right to perform source inspection at supplier facilities.

General supplier requirements regarding ADRs are:

• When a deviation to a requirement including a drawing, specification, packaging, or a material shortage is known or expected to exist, the supplier must submit an ADR to the SQE or designated representative using the authorized ADR process. Example deviations include alternate materials, processes, documentation errors omissions, changes to spare part lists, subcomponents or software even if it does not appear to change fit, form, or function within assemblies.

• ADRs should be submitted for any deviated items at the supplier, in transit from the supplier to Axcelis or its customers, or at an Axcelis facility.

• An ADR must be submitted and approved prior to shipping deviated parts. Axcelis has the right to request additional inspections and tests beyond applied drawing and specifications to prove deviated part's form, fit and function prior to ADR disposition.

• The ADR must contain detailed description, containment, probable source and proposed remedial action information as part of the initial submittal. Failure to supply all the information may result in the ADR being rejected for missing or inaccurate information. If ADR negatively impacts Axcelis fulfillment, the supplier may be charged for all related costs per PO agreement. ADRs are limited exceptions to Axcelis requirements. The approved ADR applies only to PO's listed on the ADR.

• Unless the ADR involves a drawing change, Axcelis expects the nonconformance(s) to be eliminated on subsequent deliveries.

• No rework or repair shall be performed on a deviation prior to disposition by Axcelis.

• ADRs must be submitted by the primary supplier (the seller on the PO), including deviations related to a sub-tier supplier's scope.

6.6 Non-Conforming Material

Any request for product deviation or waiver shall be brought to the attention of Axcelis in writing. A product deviation request must be made prior to the delivery of the component, utilizing an Axcelis ADR form.

An Axcelis ADR form shall also be submitted for approval prior to delivery when the component is built to an Axcelis preliminary or redlined drawing.

The supplier should establish and maintain documented procedures to ensure suspected or proven non-conforming parts are prevented from unintended use or assembly. The control procedures shall consist of identification, documentation, evaluation, segregation & disposition of non-conforming products.

If a non-conforming part is delivered to Axcelis, the supplier is responsible to aid Axcelis in evaluating and correcting the problem. Axcelis is entitled to recover all costs reasonably incurred in taking corrective action from the supplier. If the nonconformance part is reworked, the supplier shall verify that the rework part is still meeting print requirement.

Where requested containment is expected to be immediate when nonconformances are discovered. Containment plans are expected to be communicated to Axcelis and implemented within 24 hours depending on the severity of the issue.

Deviations from this timeline must be approved by the Axcelis QE.

Containment actions apply to products, process and materials in which the nonconformance was detected as well as similar products or product families in which the nonconformance may occur. Containment will also apply when a formal RCA/CAPA is initiated. Containment at the supplier is expected to:

• Isolate (separate from normal production)
• Insulate (inspect products to sort for defects at the supplier, in transit for shipment and at the customer site)
• Aid in control of risk related to the nonconformance
• Document the supplier's efforts to verify control of its processes.

The supplier is expected to identify all applicable sources of the problem to include:
• Situations involving the same or similar material, product, equipment
• Instrument or system abnormalities and inconsistencies in the process
• Environmental conditions (e.g., temperature, humidity, light)
• Trends associated with equipment performance or specifications

Where applicable, suppliers should provide a rework or repair concept plan for all deviating products and services prior to disposition. Repair or rework recommendations should include:

• Identified risks that would adversely impact the product
• Planned completion date
• Estimated time (labor) required to complete correction
• The supplier shall have a positive identification plan, which ensures deviations and or corrected and or conforming materials are appropriately identified.

The Supplier must document and show evidence to Axcelis that the remedial actions have been executed. Axcelis will validate that the remedial actions eliminated the deviating condition or met the disposition requirements.

If requested, the supplier must send a copy of the approved ADR along with the part(s) at the time of shipment. Additional markings also may be required.

ADVANCE DEVIATION AND WAIVER FORM

PRC SUPPLIER CORRECTIVE ACTION REPORT FORM

6.7 Traceability

Where required by Axcelis or other industry standards/codes, suppliers and sub-suppliers are to ensure that traceability of components or raw materials is implemented, and such records are available for review upon request by Axcelis. Traceability may be accomplished via serial numbers, batch/lot numbers, etc. as deemed appropriate, or as specified in the part document. Axcelis reserves the right to assign serial numbers to suppliers and in such cases will endeavor to do so prior to the start of production.

MARKING SPEC PROC

6.8 Material Handling, Preservation, and Packaging

All suppliers shall provide sufficient safeguards during design, manufacture, test and transfer of products and equipment to ensure items are properly handled, protected and segregated, to prevent damage or otherwise adversely impact workmanship. In the event products will be shipped internationally (water/air), they will be prepared, packaged in accordance with commercial best practice with special care to ensure that items are

protected to avoid damage and preserved to prevent rust etc. Axcelis General Packaging Labeling and Handling Specification and/or specific packaging notes called out in the part document shall apply. Axcelis reserves the right to review packaging prior to shipment.

PROC GENERAL PKG LBL AND HNDL SPEC

7 Supplier Monitoring

Axcelis continually monitors the performance of all suppliers during production. Particular attention is paid to critical suppliers utilizing a supplier scorecard. The supplier scorecard will monitor supplier performance in the following areas, where applicable:

- Quality performance
    - Incidents & DPPM's and quantity of quality escapes to Axcelis (non-conformances identified by Axcelis at or after the time of delivery/acceptance) within the preceding month and over a rolling 12 months
    - Metrics on Advance Deviation Requests and 8D / SCAR may also be tracked separately

      ADVANCE DEVIATION AND WAIVER FORM
- Delivery performance
    - Percent of deliveries on time to Axcelis need date or supplier's committed lead time at point of receipt all deliveries within the preceding month and over a rolling 12 months
    - Percent of deliveries on time to supplier's promised delivery date at point of receipt within the preceding month and over a rolling 12 months
- Cost performance (tracked internally at Axcelis):
    - Quantity and dollar value of receipts over a rolling 12 months
    - Quantity and dollar value of receipts, and cost variances within the preceding month and over a rolling 12 months are tracked separately
    - Freight and transport expenses paid by Axcelis may also be tracked separately
- Partnership performance
    - Responsiveness to Axcelis communications, requests, change orders, receiving issues, warranty claims, etc. may be communicated separately from the supplier scorecard.

The supplier scorecard will be generated on a monthly basis and provided to the supplier for review and comment as required. If necessary, an 8D or performance improvement plan may be requested to address low ratings in specific areas.

7.1. Supplier Performance Management

Axcelis SQEs will conduct a monthly performance review with the suppliers, where necessary, to track the status of outstanding actions.

Poor performing suppliers which continually fail to meet Axcelis requirements or make positive progress will be subjected to remedial actions from Axcelis. Actions may include, but are not limited to:

- Inclusion of supplier on Focus Supplier List
- Implementation of “HOLD” status on new businesses
- Exit from supplier

Supplier Performance Evaluation

a. Suppliers failing to meet established performance, quality, or delivery standards are subject to a supplier performance evaluation.

b. Suppliers are responsible for identifying and driving Improvement Plans based on Quality requirements. These requirements can include, but are not limited to, an established escalation process as mandated by the QE or designated representative.

c. Part of the escalation process may include the re-evaluation of the supplier by the completion of a new Supplier Audit Assessment Form followed by a Quality Management Audit Visit to complete the Supplier Assessment. The purpose of this visit is to assist the supplier with Support Methodology to help with the necessary efforts to completion with the removal process from “focus supplier” status.

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REV	CHANGE DESCRIPTION	CHG BY	CHG DATE	CHKD BY
Enter Rev	Choose a change Type	Enter your first initial last name	Enter date changed	Enter checker's first initial last name
A	Initial Release	Ken G.	27th Sept 2019	CY Ong
B	Updates Section 3.1 to add sub-bullet #7 (covers counterfeit materials requirement)	Ken G	31st Mar 2020	JKulunjian
C	Update sections related with Advanced Product Quality Planning (APQP) and Production Part Approval Process (PPAP).	A.Chau	August 11, 2020	C. DaSilva
D	Adding note to PO when applicable for Quality requirement from Advanced Product Quality Planning (APQP) and Production Part Approval Process (PPAP).	A. Chau	October 9, 2020	C. Da Silva
E	Adding new requirements and methodology for supplier approval, evaluation and monitoring. Process alignment with A.P.	L. Carlson A.Lee	August 7, 2022	C. Da Silva