



SUPPLIER QUALITY MANUAL

Alpha Global Headquarters
300 Atrium Drive, 3rd
Somerset, NJ 08873
U.S.A.
1-908-791-3000

Enthone Global Headquarters
350 Frontage Road
West Haven, CT 06516
U.S.A.
1-203-934-8611

Document: ALENT-GLB-REF-0115	Title: Supplier Quality Manual	Page 1 of 23
Revision Level: 2	Effective date: 24-Apr-2014	Uncontrolled if Printed



Authors / Editor		
Name	Title	Date
Michael Gerwien	Supplier Engineer, Enthone Americas	June, 2013
Juan Rios	QA Manager, Alpha Monterrey, MX	June, 2013
Ed Wilk	QA Manager, Alpha Altoona PA, USA	June, 2013
Nick Banis, Ph.D. (Author/Editor)	Vice President, Global Quality, Alent	June, 2013

Initial Reviewers		
Name	Title	Date
Greg Watka	Director of Operations, Alent Americas	June, 2013
Kevin Ovia	Global Technical Director, Enthone	June, 2013
Wim van Ravenswaay	Vice President of Operations, Alpha Europe	June, 2013
Eric Kwok	Vice President of Operations, Alpha Asia	June, 2013
Angelo Gulino	Director of Global Process Engineering, Alpha	June, 2013
Stephan Sitta	Vice President of Operations, Enthone Europe	June, 2013
Alex T.C. Tang	Vice President of Operations, Enthone Asia	June, 2013
Sylvia Lake	Procurement Manager, Alent Americas	June, 2013
Taras Gormanyuk	Procurement Director, Alent Europe	June, 2013
Ronnie Lam	Regional Supply Chain Director, Asia	June, 2013
Paul Jackson	QA Director, Alent Europe	June, 2013
Roger Ho	QA Director, Alpha Asia	June, 2013
Juan Rios	QA Manager, Alpha Monterrey MX	June, 2013
Sandro Fernandes	QA Manager, Alent Brazil	June, 2013
Jan Dekker	QA Manager, Alpha Naarden NL	June, 2013
Tamas Erdosi	QA Manager, Alpha Dunaharaszti, Hungary	June, 2013
Ad Kersten	QA Manager, Enthone 's-Hertogenbosch, NL	June, 2013
Holger Quitzsch	QA Manager, Enthone Langenfeld	June, 2013
Eric Chou	QA Manager, Alpha Taiwan	June, 2013
S.G. Cho	QA Manager, Alpha Korea	June, 2013
Ai Wah Lim	QA Manager, Alpha Singapore	June, 2013
Prasanna Dhanasekar	QA Manager, Alpha Chennai	June, 2013

Approvals			
Name	Signature	Title	Date
Dave Penman	Electronic in e-QMS	Vice President, Global Operations, Alent	24-Apr-2014
Nick Banis, Ph.D.	Electronic in e-QMS	Vice President, Global Quality, Alent	24-Apr-2014
Ken Doersch	Electronic in e-QMS	Director, Global Procurement, Alent	24-Apr-2014

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25-Jun-2013	Initial Release
24-Jun-2014	Updated section 4.9 to impose additional and strict adherence to Alent plc Supplier Change Control Requirements. Removed the requirement for a signed "supplier acknowledgement" as having received the supplier quality manual (Procurement will follow-up with select Strategic and Critical suppliers to ensure that the requirements of this manual are well understood).

Document: ALENT-GLB-REF-0115	Title: Supplier Quality Manual	Page 2 of 23
Revision Level: 2	Effective date: 24-Apr-2014	Uncontrolled if Printed



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Document: ALENT-GLB-REF-0115	Title: Supplier Quality Manual	Page 3 of 23
Revision Level: 2	Effective date: 24-Apr-2014	Uncontrolled if Printed



Table of Contents:

1.0 Introduction:

- 1.1 Overview
- 1.2 Alent plc Quality Policy
- 1.3 Scope
- 1.4 Approach
- 1.5 Supplier Code of Conduct
- 1.6 Responsibilities
- 1.7 Communication
- 1.8 Conflict Minerals
- 1.9 Receipt and Acceptance of Supplier Quality Manual

2.0 Purchasing/Sourcing:

- 2.1 Supplier Sourcing
- 2.2 Request for Quote (RFQ)
- 2.3 Purchasing Specifications
- 2.4 Purchasing Terms and Conditions
- 2.5 Request for Deviation
- 2.6 Charge Back Policy

3.0 Quality Requirements:

- 3.1 Quality Management System
- 3.2 Supplier Evaluation
- 3.3 Supplier Assessments / Audits
- 3.4 Approval of Raw Materials
- 3.5 Supplier Approval
- 3.6 Approved Supplier Listing
- 3.7 Sub-supplier Control (Upstream Suppliers)
- 3.8 Corrective Action
- 3.9 Continuous Improvement
- 3.10 Supplier Rating and Performance Monitoring
- 3.11 Supplier Development and Recognition

Document: ALENT-GLB-REF-0115	Title: Supplier Quality Manual	Page 4 of 23
Revision Level: 2	Effective date: 24-Apr-2014	Uncontrolled if Printed



4.0 Process Management Requirements:

- 4.1 Product and Process Design
- 4.2 Incoming Materials Control (IQC)
- 4.3 Manufacturing Equipment and Standard Operating Procedures
- 4.4 Measurement System Analysis (MSA) and Stability
- 4.5 Design & Process Failure Mode & Effects Analysis (FMEA) & Control Plans (CP)
- 4.6 Special Characteristics and Process Capability (Cp/Cpk)
- 4.7 Statistical Process Control
- 4.8 Inspection and Test Methods/Protocols
- 4.9 Change Control
- 4.10 Traceability
- 4.11 On-the-Job Training (OJT)
- 4.12 Packaging and Storage conditions – FIFO
- 4.13 Delivery – Shipping/Transportation Requirements
- 4.14 Certificates of Analysis
- 4.15 Records Retention
- 4.16 Material Performance
- 4.17 Quality Audits (Internal and Upstream)

5.0 Business Continuity Plan

6.0 Regulatory and Health, Safety, & Environment (HS&E) Requirements

7.0 Control of Alent plc provided tooling and equipment:

- 7.1 General Requirements
- 7.2 Requirements for tooling and Equipment

8.0 Glossary of Terms

Document: ALENT-GLB-REF-0115	Title: Supplier Quality Manual	Page 5 of 23
Revision Level: 2	Effective date: 24-Apr-2014	Uncontrolled if Printed



1.0 Introduction:

1.1. Overview

Alent, plc is a leading global supplier of consumable engineered materials used primarily in the electronics, automotive and select high growth markets. Alent plc was formerly a part of Cookson Group plc, known as Cookson Performance Materials, a leading materials sciences company supplying specialist consumable materials and chemicals used in industrial production processes. Following the demerger of the main divisions of Cookson Group plc on December 19, 2012, Alent plc emerged as a separate and independent public company listed on the London Stock Exchange, and is a constituent of the FTSE250.

Alent plc, the parent company name, is comprised two business segments: **Alpha** and **Enthone**, hence our name Alent. **Alpha** (Assembly Materials) is the global leader in the development, manufacturing and sales of innovative materials used in electronic assembly processes. Alpha supplies a full line of Solder Paste, Stencils, Bar Solder, Cored & Solid Wire Solder, Wave Soldering Fluxes, Photovoltaic Solar products such as pre-fluxed Ready Ribbon ®, advanced sinter technology (e.g. Argomax™ product lines), as well as Reclamation services for solder scrap. **Enthone** is a global supplier of high performance specialty chemistry, coatings, and materials to the electronics and surface finishing industries. Enthone coatings add value to a diversity of metals, plastics and other substrates by improving or changing performance characteristics, extending product life, and adding value. Leading OEMs worldwide depend on Enthone to enhance wear and corrosion protection, improve appearance, and enable electronic performance.

1.2. Alent plc Quality Policy

To maintain our position as a technology leader across targeted market segments, Alent employees are aggressively committed to quality and the accelerated delivery of products, processes and services that consistently meet or exceed our customers’ expectations. The following practices are key to this strategy:

- Adhering** to and continually improving quality systems for managing design and operational activities
- Utilizing** management systems that comply with globally standardized processes and methodologies for “copy equivalent” performance
- Partnering** with our suppliers to improve material and service quality, as well as to jointly reduce cost
- Conducting** Measurement System Analysis (MSA) on a regular basis to validate accuracy and precision
- Constantly improving** manufacturing processes to reduce product variability
- Accelerating** many aspects of our business with a clear focus on *Creating Customer Value, New Product and Technology Development, Operational Execution, People Development, and Penetrating New Growth Markets*
- Promoting** a culture of sustainability, including reducing waste and energy consumption

By successful execution of this policy, we will continuously improve our performance to maintain Best-in-Class customer satisfaction.

Document: ALENT-GLB-REF-0115	Title: Supplier Quality Manual	Page 6 of 23
Revision Level: 2	Effective date: 24-Apr-2014	Uncontrolled if Printed



1.3. Scope

The Alent plc Supplier Quality Manual (SQM) identifies requirements that apply to selected critical suppliers and subcontractors in the company's supply chain. The supply chain consists of, but not limited to, suppliers of materials and/or services that may have direct and/or indirect impact on Alent's product quality. Acceptance of purchase orders constitutes agreement and commitment of the supplier to comply with the Alent plc expectations per the requirements of this manual. The Alent plc supplier manual establishes minimum requirements, is supplemental to, and does not supersede or alter any purchase agreement.

1.4. Approach

The Alent plc business segments (Alpha and Enthone) place significant effort in selecting the best suppliers for raw materials and services based on such factors as ability to deliver material to our specifications consistently.

The company's approach for "Supplier Control" is simple:

- 1) Once selected, a key goal is to work with suppliers to develop a strong and long-term relationship.
- 2) Adherence to the supplier requirements set forth in this manual in accordance with the main processes identified in the diagram below. When indicated, the word "shall" denotes mandatory requirements and the word "should" denotes a recommendation.



1.5. Supplier Code of Conduct

Alent plc suppliers shall ensure that operations are performed in a manner that is appropriate as it applies to their ethical and social responsibilities as well as adhering to all local, state, and federal legal and environmental laws/regulations in their country of origin.

Alent plc Suppliers shall not discriminate against race, color, sex, religion, age, physical disability, political affiliation, or other defining characteristic as prohibited by local, state, and federal laws/regulations in their country of origin.

Alent plc Suppliers shall employ workers of minimum legal age in accordance with local, state and federal laws/regulations in their country of origin. Child labor laws shall be followed.

Alent plc Suppliers shall not practice the use of forced or indentured labor, shall not exceed the daily/weekly working hours permitted, and employees shall be compensated in accordance with local, state, and federal laws/regulations in their country of origin.

Evidence of corruption, bribes, improper advantage, or any other illegal practice by the supplier or associated operations will result in termination of relations between the supplier and Alent plc.

This entire section also applies to the supplier's sub-tier sources. It is the responsibility of the supplier to verify and monitor compliance of this code, including sub-tier source operations.

Document: ALENT-GLB-REF-0115	Title: Supplier Quality Manual	Page 7 of 23
Revision Level: 2	Effective date: 24-Apr-2014	Uncontrolled if Printed



1.6. Responsibilities

Alent plc Global Procurement and Global Quality Assurance are responsible for the promotion of this Supplier Quality Manual (SQM) to critical suppliers.

Suppliers are responsible for ensuring that products and/or services provided meet established requirements and shall assume full responsibility for the quality of supplied materials and services.

The verification and approval of facilities, systems, records, and supplier materials by Alent plc does not relieve the supplier of its obligation to provide acceptable materials or services, nor does it exclude these items from possible subsequent rejection by Alent plc if they are found not to meet agreed upon requirements.

1.7. Communication

Communications between Alent plc and suppliers shall be through the company’s Procurement Departments (local, regional, and/or global) and/or selected functions that are empowered to work with suppliers on improvement activities (i.e. quality assurance, process engineering, etc.). Communication regarding price, delivery, design or schedules between suppliers and Alent plc supporting groups such as R&D, Quality Assurance, or Manufacturing must be confirmed and approved by Procurement.

All written communication from suppliers, including *Technical Literature, Documentation in support of Submissions for Qualification, First Articles Inspection (FAI), Email, Supplier Messages, Announcements, Planning Schedules, Invoices, Responses to Requests for Quote (RFQ), Contact Information*, etc., should be in English whenever possible and routed to the Procurement Department.

1.8. Conflict Minerals

Both Alpha and Enthone are quite sensitive and totally against doing business with any supplier involved in unethical practices, especially obtaining metals/minerals mined in conditions of armed conflict and human rights abuses. Alent, specifically Alpha, is aware of the allegations that tin mined in conflict areas of the Democratic Republic of the Congo ("DRC") may be making its way into the electronics supply chain and that profits from tin mining in conflict areas in the DRC, so called "conflict tin", may be furthering certain unfair labor practices or other human rights violations in the DRC.

Both Alpha and Enthone have adopted a due diligence policy designed with the intent of preventing purchase of conflict minerals from our supply chain that originate in the DRC conflict areas. Our ultimate goal is to provide complete transparency of our supply chain to our customers. Additionally, Alpha and Enthone are currently collaborating with several industry groups to develop and implement a comprehensive supplier approval system to support this policy, which will help ensure that conflict minerals will not become part of the company’s metal supply, especially Tin (Alpha Business Group), which is most visible.

Alent plc expects all suppliers doing business with Alpha and Enthone to provide conflict free materials. When requested by an Alent plc Procurement Representative, Alent plc expects suppliers to complete and forward the “**Electronic Industry Citizen’s Coalition’s (EICC) Conflict Minerals Reporting Template**” as proof of being a “conflict free” company. If suppliers cannot demonstrate sufficient due diligence that their supply channel is Conflict Free, they may be suspended until such time that material improvement is made and the supplier can demonstrate due diligence toward being a Conflict Free materials supplier.

Document: ALENT-GLB-REF-0115	Title: Supplier Quality Manual	Page 8 of 23
Revision Level: 2	Effective date: 24-Apr-2014	Uncontrolled if Printed



1.9. Receipt and Acceptance of the Supplier Quality Manual

“Strategic Critical” and selected “Critical” suppliers (see Glossary of Terms in section 8.0) that are awarded business with Alent plc shall:

- Read the ALENT PLC Supplier Quality Manual.
- Print, Sign, Date, and return the Acknowledgement form (last page of manual) as verification of having read the Alent plc SQM and agreeing to comply with its contents and requirements.
- Verify that the most current revision level of the Alent plc Supplier Manual is in use, which can be obtained through the Alpha and Enthone web sites as follows:

<http://alpha.alent.com/>

<http://www.enthone.com/>

Suppliers are responsible for obtaining and utilizing the most current version of this document. If there are any areas of this manual that are of concern to a particular supplier, Alent plc will assist with interpretation and may agree to an addendum on specific points if warranted.

2.0 **Purchasing / Sourcing:**

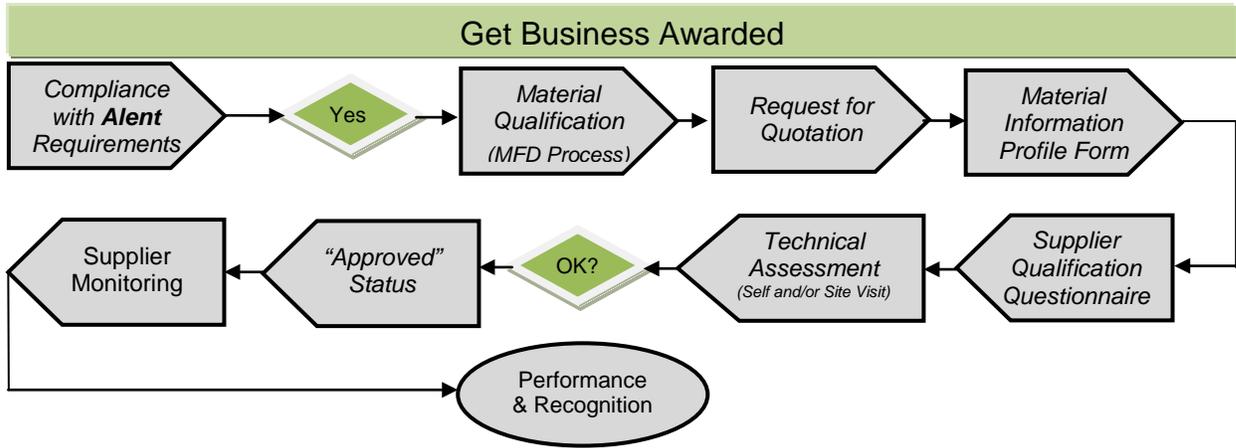
2.1 Supplier Sourcing

Awarding business to a supplier is one of the most critical decisions made by ALENT plc Procurement at all levels. Materials and/or services purchased impact the company’s ability to deliver quality products consistently to our customers, remain competitive, and maintain good relationships with our customers for future product development efforts. The Alent plc “Global Sourcing” process reflects the contribution and coordination of key Alent plc Stakeholders (e.g. R&D, Procurement, Regulatory, Quality, etc.) for material qualification, pricing, regulatory compliance, and acceptability. This is a first step in building a strong relationship between Alent plc Procurement and the Supplier. As such, suppliers have a significant role in this process, such as:

- Allowing Alent plc to perform supplier audits when requested to verify compliance with “Good Business Practices” and quality requirements.
- Demonstrating acceptable performance in day to day business and acceptable achievement of scorecard results (i.e. On-Time Shipments and Quality at Receipt in an Alent plc facility).
- Quick responses to arising issues (SCAR’s when issued) with no repeat excursions. Depending on business impact, Alent plc expects an initial response within one (1) business day and full resolution within one (1) week. For complex issues, the timeframe for resolution shall depend on the severity of a nonconformance and business impact (negotiated between relevant parties), but expediency is expected in all cases.

The diagram below depicts the main steps of the process:

Document: ALENT-GLB-REF-0115	Title: Supplier Quality Manual	Page 9 of 23
Revision Level: 2	Effective date: 24-Apr-2014	Uncontrolled if Printed



2.2 Request for Quote (RFQ)

Upon receipt of an RFQ from Alent, the potential supplier is responsible for providing the needed information in its entirety, and returning the RFQ with any other requested documentation to the issuing procurement department in a timely manner. Alent plc expects that the supplier is capable of consistently fulfilling all the requirements identified. However, if there are any requirements that the supplier is unable to consistently fulfill currently or there are potential issues in relevant areas of the RFQ, then an action plan and relevant contacts must be presented with the returned RFQ for consideration and agreement with Alent plc.

2.3 Purchasing Specifications

The supplier shall ensure that copies of any/all drawings and/or specifications provided by Alent plc are to the current purchase order revision level, and shall be fully understood and available to all supplier personnel responsible for meeting Alent's requirements.

Alent plc documents are considered confidential, and shall not to be shared with any other party outside of the supplier without prior written consent of Alent. It is Alent's expectation that the supplier shall require the same level of confidentiality of any subcontractor supplying product or service as related to meeting an Alent plc requirement.

2.4 Purchasing Terms and Conditions

All suppliers of Alent plc shall comply with the terms and conditions set forth in "Supplier Terms and Conditions" (ALENT-GLB-SUP-FORM0004) in its most current revision, which is available from the procurement department.

2.5 Request for Deviation

For any the material that is not in compliance with the specified drawing, purchase order, or Alent plc specifications, a deviation request must be issued to Alent plc ahead of a scheduled shipment of an isolated specific quantity of material. Deviation requests shall be submitted in writing by the supplier to Alent plc Procurement and must be approved by Alent plc for a specific time period or quantity of parts prior to shipment. Product shipped to Alpha or Enthone with deviation authorization from Alent plc must be clearly identified as such with the reference number of the approved specification, Alent plc representative that approved the deviation, and the non-conforming issue. This information shall be clearly identified in the C of A with the delivery.

Document: ALENT-GLB-REF-0115	Title: Supplier Quality Manual	Page 10 of 23
Revision Level: 2	Effective date: 24-Apr-2014	Uncontrolled if Printed



2.6 Charge Back Policy

Any and all costs (including consequential damage) associated with nonconforming materials or delivery issues that are the responsibility of the supplier may be charged back to the supplier at the discretion of Alent plc after prior negotiations and notifications have taken place.

3.0 **Quality Requirements:**

3.1 Quality Management System

Alpha and Enthone products are well known in the market place by their quality and safety, including exceptional technical services for customers. Maintaining this reputation of selling the highest quality products in the market is what differentiates Alent plc from its competitors. Therefore, we expect our suppliers to support us in maintaining this reputation by investing and maintaining a documented, robust, and effective Quality Management System (QMS) that is certified to ISO9001 latest revision by an accredited third party certification body. For sales activities in automotive, some of Alent's manufacturing facilities are certified to ISO/TS 16949 *Quality Management Systems – Particular requirements for the application of ISO 9001:2008 for automotive production and relevant service part organizations*, and will therefore have added supplier requirements for Quality systems and performance.

In addition to QMS, Alent plc places great emphasis on certification to ISO 14001 (Environmental Management System) and also encourages OHSAS 18001 (Occupational Health and Safety).

For suppliers who are not certified to the ISO 9001 or other comparable quality standards are expected to have good systems and controls in place to guarantee "quality consistency" for every lot of material received or services rendered. These suppliers will also be subject to a quality system assessment as deemed necessary by Alpha or Enthone prior to conducting business.

3.2 Supplier Evaluation

A new supplier will be requested to complete a "Material Information Profile" (ALENT-GLB-SUP-FORM0003) that pertains to materials supplied to any/all of the Alent plc business units. Potential Critical and Strategic Critical Suppliers shall be evaluated utilizing the "Supplier Qualification Questionnaire" (ALENT-GLB-SUP-FORM0001). Upon completion in its entirety, Alent plc will be provided with the supplier's general information (i.e. address, facility information, principles, etc), background information (i.e. management system certifications, business associations, etc.), and general questions pertaining to the quality management system in place. We request that these forms be submitted to the relevant procurement department when requested.

Acceptance of key quality system requirements specified in the "Supplier Qualification Questionnaire" by Alent plc is a pre-requisite for suppliers doing business with Alpha and Enthone, especially for any suppliers that are not ISO 9001 certified, where a documented quality system must be in practice.

Suppliers who are certified to ISO9001 are not required to fully complete the "Supplier Qualification Questionnaire" (submitting the registration certificate and the partially completed questionnaire as required will suffice). These suppliers are also required to submit their renewed registration certificate upon expiration.

If any of the supplier's certificates are withdrawn by the registrar, the supplier shall notify Alent plc within 90 days, which will trigger a supplier evaluation using the "Supplier Assessment Questionnaire".

Document: ALENT-GLB-REF-0115	Title: Supplier Quality Manual	Page 11 of 23
Revision Level: 2	Effective date: 24-Apr-2014	Uncontrolled if Printed



At the discretion of Alent plc Stakeholders (e.g. Purchasing, Quality, Technical, etc.), Critical and Strategic Critical Suppliers may also be required to complete a more in-depth “Supplier Assessment Questionnaire” (ALENT-GLB-SUP-FORM0002), which is managed by Alent plc procurement. The supplier assessment criteria where favorable results are expected include:

- 1) Improvement Strategy and Leadership
- 2) System to Manage Risk
- 3) Health and Safety Management System
- 4) Environmental Management System
- 5) Purchasing Process
- 6) Quality Management System
- 7) Management of Hazardous Processes
- 8) Technology Resources
- 9) Supply Chain Controls and Logistics
- 10) Process documentation and manufacturing controls
- 11) Business Continuity Plan

The extent to which this questionnaire shall be completed by the Supplier shall be discussed and agreed upon with Alent procurement, who will advise if the assessment remains as a remote activity or if the completion of the questionnaire is in preparation for an on-site assessment visit.

3.3 Supplier Assessments / Audits

Alent’s “Supplier Qualification Questionnaire” (ALENT-GLB-SUP-FORM0001) and/or “Supplier Assessment Questionnaire” (ALENT-GLB-SUP-FORM0002) are used to verify that potential new suppliers have the appropriate quality and business systems in place to meet Alent’s system requirements. These questionnaires may also be used to verify that current suppliers have effectively maintained their quality and business systems.

Alpha and Enthone suppliers are required to complete Supplier questionnaires when issued to them and return to Alent plc procurement in a timely manner. Completion of questionnaire(s) is also a prerequisite for an “on-site” audit when requested by Alent.

A quality audit may be performed by Alent plc representative(s) at the supplier’s manufacturing location, which is typical for new suppliers and those who do not have formal quality management systems (*ISO 9001 or ISO/TS16949 certification*), or suppliers who have not met Alpha’s and/or Enthone’s performance expectations.

Upon request by Alent, a third party representative or customers shall be entitled to visit any product related location of the Supplier to conduct audits. This right shall also include audits at the supplier’s sub-supplier locations. The supplier shall provide the necessary resources as necessary to host audits requested by Alent. The supplier is, however, not obligated to reveal any proprietary information without a mutual non-disclosure agreement in place.

Document: ALENT-GLB-REF-0115	Title: Supplier Quality Manual	Page 12 of 23
Revision Level: 2	Effective date: 24-Apr-2014	Uncontrolled if Printed



3.4 Approval of Raw Materials

Alent's "Material Information Profile" (ALENT-GLB-SUP-FORM0003) may be used to evaluate whether or not potential or current suppliers are able to meet the specification requirements for specific materials that are deemed critical to Alpha and/or Enthone. Current supplier specifications and an MSDS are also required to be submitted with the completed profile. In addition, a "First Article" Inspection/Layout Review and/or PPAP may be needed for certain materials. These requirements will be discussed and identified by an Alent plc procurement manager and the potential supplier.

3.5 Supplier Approval

Suppliers must be classified as "Approved" in Alent's supplier management system in order to conduct routine business with Alpha, Enthone, or any subsidiaries. This is achieved through Alent's "Supplier Management and Development Process", which is directly managed through local procurement and quality personnel responsible for supplier management.

3.6 Approved Supplier Listing

Alent plc maintains supplier information in the company's "Enterprise Resource Planning" application (i.e. JD Edwards), and an Approved Supplier List (ASL), which contains supplier contact information, supplier status, and the documentation of approval. Alent's ASL also identifies items and services that are purchased, and identifies the supplier as "Critical" or "Strategic Critical".

3.7 Sub-Supplier Control (Upstream Suppliers)

As an Alent plc supplier, we also expect that the requirements specified in this manual will be passed on "upstream" to sub tier suppliers to ensure that quality is consistent through the entire supply chain. We encourage our suppliers to have a program in place requiring sub suppliers to be certified to ISO 9001 by a 3rd Party Registrar with a follow-up plan, and where warranted, ISO/TS 16949 certification. Alent plc Purchasing reserves the right to directly assess certain upstream processes that have a significant impact on the final quality of our products. Upon request by Alent, the supplier shall submit supplier and product approvals and corresponding quality contracts with its sub-suppliers.

3.8 Corrective Action

Suppliers are responsible for providing defect-free product and/or service, and assume full responsibility for the quality of supplied product and/or service. If a defective product or service is identified, the supplier will be contacted and a Supplier Corrective Action Request (SCAR) may be requested. A SCAR is required for any of the following:

- Nonconforming product
- Missing or incomplete certificates of compliance or material certifications
- Improper and/or inadequate packaging or labeling
- Systemic quality or delivery performance issues

Document: ALENT-GLB-REF-0115	Title: Supplier Quality Manual	Page 13 of 23
Revision Level: 2	Effective date: 24-Apr-2014	Uncontrolled if Printed



The supplier is expected to respond immediately and adequately to any quality or delivery issues with the following as applicable:

- Initial containment actions within 24hrs (1 working day)
- Containment plan to hold and inspect all suspect products (immediately)
- RMA for defective product if dispositioned as such
- Plan to replace product with certified product as prescribed by Alent plc (immediately)
- Completion of corrective action and approval from Alent plc - target one (1) week or sooner, and for more complex issues requiring in depth "Problem Solving (e.g. 8D), a longer time can be negotiated with Alent plc.

3.9 Continuous Improvement

The supplier shall demonstrate "Top Management Commitment" for a comprehensive philosophy of continuous improvement, which must be evident throughout the entire supplier organization. Suppliers must endeavor to make continuous improvements to quality, deliveries, schedules and prices to both the supplier's and Alent's benefit (supplier shall have a zero defect philosophy). The philosophy of continuous improvement should be extended to all business processes. A copy of the supplier's continual improvement program shall be furnished to Alent plc upon request. Examples of continual improvement philosophies and tools that Alent plc benefits from, and expects its suppliers to utilize are:

- Lean Manufacturing
- Error Proofing/Mistake Proofing techniques (POKA-YOKE)
- KPI's such as Yield, Productivity, On-Time-Delivery, Complaints, etc.
- Upstream supplier management
- Measurement System Analysis (MSA) with acceptable R&R's (as per Alent plc guidelines on defined critical measurement systems)
- Acceptable Capability Indices (e.g. Cp, CpK, Ppk, etc.) - as per Alent plc guidelines on defined special characteristics / critical parameters (see section 4.6)
- Use of SPC to monitor process stability
- Use of the 8D problem solving methodology for chronic issues (on request of Alent)
- Six Sigma and Lean methodologies.

3.10 Supplier Rating and Performance Monitoring

Suppliers are continuously monitored and scored on the following metrics at a minimum:

- On Time Delivery
- Quality at Receipts (Internal Testing or C of A Reviews)
- Number of SCARs issued
- Cost

Suppliers are expected to maintain focus on these three areas and achieve high standards of performance on an annual basis.

Document: ALENT-GLB-REF-0115	Title: Supplier Quality Manual	Page 14 of 23
Revision Level: 2	Effective date: 24-Apr-2014	Uncontrolled if Printed



Day to day dealings with suppliers shall lead to a general assessment of performance for the metrics listed above, including addressing arising issues or trends with periodic internal reviews by Alent plc and feedback to selected suppliers.

Formal feedback to suppliers is typically done through a “Supplier Performance Scorecard” as a Report or a structured letter sent locally to a supplier. For any low ratings, Suppliers shall respond with actions and plans for improvement, which will be followed up by Alent plc Purchasing.

3.11 Supplier Development and Recognition

The policy of Alent plc is to support the development of its suppliers as appropriate and provide recognition for sustained performance and continuous improvement. If supplier recognition is warranted based on excellent supplier performance over a period of time, nominations are made to Alent’s Director of Global Procurement. Supplier recognition can be done at the Global, Regional, or site level. The level and method of recognition (e.g. a recognition letter signed by the Director of Global Procurement, a wall-mounted plaque, a desktop trophy, etc.) is determined by regional procurement, and can be planned annually or when warranted.

4.0 **Process Management Expectations:**

4.1 Product and Process Design

Alent plc believes that the quality of products delivered to customers is determined during the design and development phase of the production process. Supporting the introduction of new products requires a well defined and organized process for project planning and launch.

Alent plc encourages suppliers to use Advanced Product Quality Planning and Control Plan (APQP) as a tool to support and validate 1) Launch of new products, 2) Development of new manufacturing processes, and 3) Significant changes to existing products or process. The APQP reference manual can be purchased through AIAG (www.aiag.org) and used as a reference in developing “Product and Process Design” plans.

The supplier’s formal “Product and Process Design” system should encompass the following minimum deliverables:

- Purchase Specifications & Sourcing
- Incoming Materials Control (IQC)
- Finished Goods Specifications
- Established **Shelf Life** based on validated data
- Manufacturing Equipment and Procedures
- Testing Methods/Protocols in Place
- Verification of Measurement System Stability and Reliability of Laboratory data (R&R Studies for all key characteristics being measured with a desirable target of less than 10% of tolerance). Acceptance release limits should account for the variation of the test method.
- Design FMEA and Process FMEA & Control Plan(s) linked to “**Process Flow**”
- Training / OJT Documents (Operators/Lab Techs, etc.)
- Process & Product validation (Finished Goods QC Data) during scale-up w/Process freeze
- Acceptable Process capability against published specifications

Document: ALENT-GLB-REF-0115	Title: Supplier Quality Manual	Page 15 of 23
Revision Level: 2	Effective date: 24-Apr-2014	Uncontrolled if Printed



- Optimal Packaging, Transportation, & Environmental Storage Conditions (Proposed packaging and transport conditions to be approved by Alent plc and guidance on storage in Alent plc shall be given by the supplier)

4.2 Incoming Materials Control (IQC)

The supplier is required to maintain a system for verifying and validating incoming quality of raw materials against purchase specifications.

IQC is critical because if substandard material enters the manufacturing process, the burden of inspecting quality and potential liability becomes greater. Therefore, "Approved" suppliers must assure material quality through their inspection practices, especially if incoming material is accepted solely on C of A or C of C reports from their suppliers.

In addition, the supplier must ensure that the handling and storage of materials and components are controlled in the supply chain so that they do not deteriorate prior to use and ample shelf life remains after receipt (our target is over 66% of shelf life remaining but never less than 50%).

For incoming raw materials control, suppliers are asked to use good judgment on the allocation of incoming inspection efforts for materials received from upstream suppliers. Factors to be considered include:

- 1) Cost of performing incoming verification testing compared to the possible damage resulting from no inspection.
- 2) Prior quality history on the part of the suppliers.
- 3) How critical the material is in the overall performance of the Finished Good (FG).
- 4) Warranty or use history.
- 5) "Process Capability" information.
- 6) Material homogeneity,
- 7) Availability of required inspection skills and equipment.

4.3 Manufacturing Equipment and Standard Operating Procedures

Raw material suppliers shall have the appropriate manufacturing equipment and provide the necessary resources for machine/equipment maintenance activities. An effective preventive maintenance system must also be in place to maintain equipment in proper working order.

Supplier shall have documented work instructions for all employees having responsibilities for processes that impact product quality. These instructions shall be current, shall be under document control, and shall be accessible for use at the work location.

4.4 Measurement System Analysis (MSA) and Stability

The supplier shall develop or obtain gages and standards that are used to measure and control manufacturing processes to within defined limits of control. Alternate methods, gages or standards may be used at Alent plc to verify supplier's inspection results. Alent plc may request suppliers to participate in correlation studies to compare supplier measurement results against results obtained by Alent plc gages and methods.

Document: ALENT-GLB-REF-0115	Title: Supplier Quality Manual	Page 16 of 23
Revision Level: 2	Effective date: 24-Apr-2014	Uncontrolled if Printed



All equipment used to measure and monitor material performance or generate test results shall be calibrated and demonstrate acceptable repeatability and reproducibility.

The supplier shall perform Measurement Systems Analysis (MSA) studies as appropriate through Gage Repeatability & Reproducibility (GR&R) studies, bias, linearity, stability, etc. for all identified **critical** gages, measurement and test equipment. Alent plc may request MSA studies and verification of calibration from the supplier for review.

4.5 Design & Process Failure Mode & Effects Analysis (FMEA) & Control Plans (CP)

Suppliers with product design responsibility should develop a Design FMEA (dFMEA) as part of their overall product design system to address the design intent and reduce the risk of failures for manufactured materials and parts. A single DFMEA may be applied to a family of similar materials.

Suppliers should also develop a Process FMEA (pFMEA) as a means to assure that to the extent possible, potential failure modes and their associated causes/mechanisms have been considered and addressed. A single pFMEA may also be applied to a family of similar materials.

The supplier shall have a visual diagram of its process (process flow). The diagram should clearly describe the production process steps and sequence.

In addition, the supplier should have a Control Plan linked to the process flow that takes into account the output from the pFMEA and defines all methods used for process monitoring and control of special characteristics. The control plan covers three distinct phases: prototype, pre-launch, and production. A single control plan may apply to a group or family of products that are produced by the same process at the same source. The Control Plan shall be made available for Alent plc to review upon request.

4.6 Special Characteristics and Process Capability (Cp/Cpk)

Alent plc may choose to designate certain key parameters for a material as a special characteristic, which will be subject to more stringent monitoring and/or additional acceptance requirements. These additional monitoring steps and acceptance requirements may include statistical control limits, performance trend analysis and/or other statistical process control tool. Special Characteristics (SC) identified by Alent plc will be communicated to the supplier.

Unless otherwise approved by Alent, the supplier shall use the acceptance criteria listed below for evaluating initial process study results and of "special characteristics" with regard to release test criteria or process parameters. Suppliers shall meet the process capability requirements as defined in AIAG PPAP and SPC reference manual. Special characteristics (SC) maybe defined by Alent plc but can also be identified by the Supplier / Manufacturer.

Results

Interpretation

Index > 1.67

The process currently meets acceptance criteria

1.33 ≤ Index ≤ 1.67

The process is marginally acceptable

Index < 1.33

The process is not acceptable

Upon request of Alent, the supplier shall provide measurement and traceability data for Special characteristics (SC).

Suppliers should be able to demonstrate ongoing process capability Cpk > 1.33 or where statistical control has not been achieved, the process performance shall be Ppk > 1.67

Document: ALENT-GLB-REF-0115	Title: Supplier Quality Manual	Page 17 of 23
Revision Level: 2	Effective date: 24-Apr-2014	Uncontrolled if Printed



4.7 Statistical Process Control

Suppliers are required to apply effective statistical process control techniques to maintain processes stability. The use of control charts such as X-Bar/R chart is highly encouraged to ensure that processes are in statistical control. Suppliers should consult the Statistical Process Control (SPC) manual published by AIAG for guidance, methods, examples, and related reference information. Special characteristics shall *be defined by the Supplier / Manufacturer but can also be identified by Alent.*

4.8 Inspection and Test Methods/Protocols

Good Laboratory Practices (GLP's) are an essential part of a well functioning Quality Management System to provide the added confidence that test results are accurate and precise. Suppliers shall use test and/or calibration methods and sampling techniques that are appropriate to the testing and calibrations being undertaken. Methods published in international, regional, or national standards shall preferably be utilized at their most current revision.

The laboratory shall document its policies, workflows, procedures and test methods to the extent necessary to assure accuracy and precision of the test and/or calibration results. Alent plc highly encourages compliance to **ISO/IEC 17025** (General requirements for the competence of testing and calibration laboratories). Accreditation to ISO/IEC 17025 for internal laboratory(s) would be an added plus and score high with Alent.

The supplier's laboratory management system shall have a defined scope of activities that includes its capability to perform the required inspections, testing or calibrations. As a minimum, the supplier laboratory system must consider and address the following:

- 1) Adequacy of laboratory procedures and test methods used
- 2) Competency of laboratory personnel that test materials
- 3) Laboratory capability to perform these services correctly (R&R's are essential to determine capability and stability of what is being measured).
- 4) Traceable to relevant process standards such as ASTM, EN, ISO, etc., and
- 5) Maintenance of test records for a period of time that a material is manufactured, plus 1 year.

4.9 Change Control

Both Alpha and Enthone have a strict "Change Control" policy that must be adhered to by every Alent plc site, which includes raw materials. As such, select critical raw material suppliers (as defined by R&D) shall have a change control system in place to timely inform **Alent plc Procurement** of major changes so there is sufficient time for internal qualification and to obtain change approval from Alent plc customers as necessary. In addition, Alent plc customers that request strict supplier "**change control**" protocols of raw materials used for a specific Product build shall be included in this process as well.

When required, Alent plc Procurement shall engage **Strategic Critical** and select **Critical Suppliers** to be proactive in notifying Alent plc of critical changes to materials that can have a significant impact on form, fit, and/or function of an Alent plc finished good. **Early Notification** is required for any change to a critical raw material that might impact batch to batch consistency for cosmetic, shelf life, reliability, quality, and/or product performance, including changes to legal compliance. As some of Alent plc products are supplied to automotive customers, the target for a **Product/Process Change Notification** requires a minimum of **six (6) months** notice, and for **Material Termination**, at least **twelve (12) months** notice is required. **Procurement** may also request a "**Change Forecast**" from strategic critical suppliers whenever possible.

Document: ALENT-GLB-REF-0115	Title: Supplier Quality Manual	Page 18 of 23
Revision Level: 2	Effective date: 24-Apr-2014	Uncontrolled if Printed



In some cases, obtaining approval from Alent plc customers for the acceptance of change may require performance testing of Alent plc finished goods containing the supplier's changed material. When requested, suppliers must provide a sufficient amount of material, at a reasonable cost and in a timely fashion, for Alent plc to complete performance evaluations with customer(s). Suppliers must continue to supply "Product of Record" (unchanged) material to Alent plc until such a time that Alent plc officially approves the supplier's change.

Examples of changes that require notification are as follows:

- Adjustments to formulation.
- Changes to product specifications.
- Changes in processing technology (totally new technology for product manufacture).
- Process modifications (e.g. addition/deletion of process steps, etc.).
- Changes to manufacturing equipment.
- Changes in raw material sources
- Changes to packaging, labeling, & shipping method.
- Changes to MSDS and regulatory/legal matters.
- Transfer of a process/sub-process to another manufacturing location.

4.10 Traceability

Supplier systems shall have complete product traceability, including all components and materials through the entire supply chain. Suppliers must be able to demonstrate lot traceability from final product back to raw materials. Lot traceability and supporting results of inspections and test data shall be kept on file and be available to Alent plc upon request for a period of time that is agreed between the supplier and Alent.

4.11 On-the-Job Training (OJT)

Suppliers are encouraged to maintain an employee certification program that includes training for jobs affecting conformance to product requirements, and informing them about the consequences to the customer when procedures are not followed. This includes temporary and contract personnel.

4.12 Packaging and Storage conditions – FIFO

Suppliers are responsible for optimal packaging to ensure product integrity during storage, shipping, and handling throughout the supply chain. Packages/containers/skids shall be free of debris, foreign materials and fluids when received at Alent.

The supplier is expected to establish and maintain a material handling system that minimizes the potential for damage throughout all operations; raw materials, purchased components, work-in-process, finished goods, and delivery.

The supplier is expected to maintain a "First In, First Out" (FIFO) system for keeping track of the order in which materials are processed and shipped to Alent.

4.13 Delivery – Shipping / Transportation Requirements

Suppliers shall maintain controls that assure products shipped to Alent plc are protected against damage, contamination or corrosion, and that the material arriving at Alent plc meets all functional and appearance specifications.

Document: ALENT-GLB-REF-0115	Title: Supplier Quality Manual	Page 19 of 23
Revision Level: 2	Effective date: 24-Apr-2014	Uncontrolled if Printed



Each lot of product supplied to Alent plc must have proper documentation available certifying material conformance to the specification identified on the Purchase Order. Special labeling requirements may be necessary, which will be defined on the purchasing documents if applicable. Packaging labels should be positioned in a manner that allows the package labels to be read without the need to rearrange the material on a skid if used.

Individual product traceability may be required in some instances, and will be defined on the purchasing documents.

For certain materials, Alent plc may require submission of test results, test data and/or pre-ship samples prior to dispatch to Alent, and will be defined on the purchasing documents.

The supplier shall establish and maintain shipping and receiving facilities, and arrange for the protection of the quality of the product after last production operation through delivery to Alent.

4.14 Certificates of Analysis (C of A)

A Certificate of Analysis (C of A) shall be supplied with each shipment to Alent plc identifying test methods and actual results for each characteristic in the purchasing specification. This establishes compliance of the supplier's product to the purchasing specification. The material test report shall indicate the number, date, and change level of the specifications to which the material was tested and the date on which the testing took place, as well as any further requirements indicated on the purchase order. A C of A is required for each material batch number delivered to Alent plc facilities.

4.15 Records Retention

Suppliers shall retain their quality records for a time period that the material is being manufactured plus one year. Upon request, the supplier shall be capable of retrieving and delivering required records within forty-eight (48) hours from time of request by Alent.

4.16 Material Performance

Alent's suppliers are responsible for providing defect-free consistent product with acceptable Cp/Cpk requirements as stated in section 4.6. Consistency of product is expected throughout a batch/lot, as well as between batch/lot to batch/lot. The key requirement for Alent plc suppliers is simple: **LOT-TO-LOT CONSISTENCY**.

4.17 Quality Audits (Internal and Upstream)

Suppliers are required to conduct internal quality audits to validate continuing system effectiveness. In addition, suppliers are expected to conduct upstream supplier audits and monitoring as evidence of an active "supplier management" system.

5.0 Business Continuity Plan:

Suppliers shall have a business continuity plan (BCP) that allows for the safeguarding, storage and recovery of engineering drawings, electronic media, production tooling, and materials in the event of damage or loss. Suppliers who are deemed "Critical" or "Strategic Critical" by Alent plc shall be required to have a written and comprehensive BCP, which shall be forwarded to Alent plc for review upon request. This plan shall also contain contingency actions to satisfy Alent plc requirements in the event of a significant utility interruption, labor shortages or stoppages, equipment failure, and field returns.

Document: ALENT-GLB-REF-0115	Title: Supplier Quality Manual	Page 20 of 23
Revision Level: 2	Effective date: 24-Apr-2014	Uncontrolled if Printed



The supplier Business Continuity Plan shall outline the redundant systems built into their business model to ensure product and service continuity in the event of an “interruption” event. The plan shall focus on strategic efforts in Operations and the commercial service redundancies designed to ensure continuous support to Alent. The following three areas are critical to this process.

- ◆ Sales Support
- ◆ Field Technical Support
- ◆ Manufacturing Operations

In the case of an “interruption” event that forces a temporary shut-down of a manufacturing facility, the supplier shall identify the leadership team that has the overall responsibility to lead the organization in the management of continuous business operations.

6.0 Regulatory and Health, Safety, & Environment (HS&E) Requirements

All materials purchased shall meet current government safety and regulatory laws that apply to restricted substances, toxic or dangerous, and also respectful environmental considerations applicable at the country of manufacture and sales. Suppliers are expected to fulfill all requirements, even in the event that Alent’s requirements exceed general requirements. Suppliers shall notify Alent plc of any change that has impact on environment commitments or regulatory requirements.

Alent plc believes that good health, safety and environmental performance is an integral part of an efficient and profitable business management. We truly recognize that these matters rank equally in importance with other management responsibilities and that success in these areas depends on the involvement and commitment of everyone in the organization.

Suppliers doing business with Alent plc are expected to operate in a manner which preserves health, safety and a sound environment. The minimum acceptable standard is to meet all legal health, safety, and environmental obligations with systems that are continuously improving. Therefore, all suppliers shall have an effective and documented system for addressing Health, Safety, and Environmental requirements.

It is highly encouraged that supplier to Alent plc achieve certification to ISO 14001 (Environmental Management System) and OHSAS 18001 (Occupational Health and Safety Management System) standards.

7.0 Control of Alent plc provided tooling and equipment:

7.1 General Requirements

All tools and equipment for manufacturing, testing, or inspection that is owned by Alent, or Alent’s customers, must be used exclusively for Alent plc products unless a written authorization specifies otherwise.

Document: ALENT-GLB-REF-0115	Title: Supplier Quality Manual	Page 21 of 23
Revision Level: 2	Effective date: 24-Apr-2014	Uncontrolled if Printed



7.2 Requirements for Tooling and Equipment

All Alent plc owned tools and assets bear an inventory number for tracking. The supplier shall establish procedures for permanent identification and traceability of products and equipment provided by Alent, including marking the tooling with '*Property of Alent*'.

The supplier shall provide written notice to Alent, for any loss, damage, or impairment suffered by any Alent plc owned tools and equipment. The tools and equipment provided cannot be disposed of without prior written permission from Alent. The supplier is responsible for the maintenance, traceable calibration, proper storage, etc. of all Alent plc owned tools and equipment in their possession.

8.0 **Glossary of Terms**

Approved Supplier – A supplier identified in Alent's JDE system address book or other register within Alent. These suppliers are approved for Alent plc to conduct routine business with.

Calibration – A set of operations that establish, under specified conditions, the relationship between a measuring device and a traceable standard of known reference value and uncertainty.

Certificate of Analysis (CoA) – A record of delivering where supplier provides the results of the tests applied to products prior to shipping with the actual test results against the purchase order specification.

Critical Supplier – All suppliers of raw material(s), or service(s) that are essential to the normal operation of an Alent plc site, shall be considered as a critical supplier by the site serviced.

Electronic Data Interchange (EDI) – Electronic transmission of purchase orders and invoices (not facsimile) using networks such as the internet.

First Article Inspection / Layout Review – All dimensions of a part or parts are checked and verified prior to the production and delivery of the parts on the premises of Alent. Must be listed all dimensions (except reference dimensions), features and specifications, as stated in the drawing/design and the process control plan, including the notation of the resulting real dimensions. No general statements of conformity are permitted.

Gage R&R – An estimate of the combined variation of repeatability and reproducibility for a measurement system.

Inherent Variation – The process variation due to common cause only.

Measurement System – A collection of instruments or gages, standards, operations, methods, fixtures, software, personnel, environment, and assumptions used to quantify a unit of measure of fix assessment to feature characteristic being measured; the complete process used to obtain measurements.

Process Capability Index (Cpk) – A comparison of the inherent variability of a process output to specification limits under statistically stable conditions.

Document: ALENT-GLB-REF-0115	Title: Supplier Quality Manual	Page 22 of 23
Revision Level: 2	Effective date: 24-Apr-2014	Uncontrolled if Printed



Production Part Approval Process (PPAP) – Defines generic requirements for production part approval, including production and bulk materials. The purpose of PPAP is to determine if all customer engineering design record and specification requirements are properly understood by the organization and that the manufacturing process has the potential to produce product consistently meeting these requirements during an actual production run at the quoted production rate.

Return Material Authorization (RMA) – The process of having a product repaired or replaced in order to receive a refund or credit.

SCAR (Supplier Corrective Action Request) – A specific corrective action form that is formally issued to suppliers for any raw material excursion from agreed upon requirements.

Service Providers – include but not limited to, calibration services, outsourced manufacturing and/or packaging, outsourced tool manufacturing and maintenance of equipment, logistics.

Special Characteristics – are product characteristics or manufacturing process parameter which can affect safety or compliance with regulations, fit, function, performance or subsequent processing of product (refer to Alent plc specification for designated special characteristics)

Strategic Critical Supplier – Those critical suppliers that could significantly affect overall profitability, competitiveness, and success of the organization, or bring potential risks.

Document: ALENT-GLB-REF-0115	Title: Supplier Quality Manual	Page 23 of 23
Revision Level: 2	Effective date: 24-Apr-2014	Uncontrolled if Printed