Supplier Quality Manual

Effective: 1 November 2022

SUPPLIER QUALITY POLICY

OTIS is committed to delivering on-time, defect-free products and services, every day, in every market, throughout the full product lifecycle. This continuous commitment guides the actions of our employees, suppliers, and partners to never compromise on safety, compliance, or quality. Our goal is to be the most trusted provider of solutions for customers and passengers in the industries we serve.

Suppliers play an integral role in ensuring the quality and cost effectiveness of OTIS products and shall comply with all requirements defined in this manual or communicated otherwise.

Expectations
Perfect parts, on time, at the right cost, and produced safely.

Quality system: The supplier shall maintain a quality system that meets or exceeds ISO9001, AS9100, IATF 16949, or VDA 6.1 and is certified by an accredited third-party certification body.

EHS: OTIS encourages Environmental, Health and Safety Systems that comply with ISO14001 and ISO45001, but at a minimum, supplier must meet all OTIS EHS requirements.

Sub tier suppliers: The supplier shall ensure their sub-tier suppliers, including directed-buy sub-tier suppliers, follow all OTIS purchase order and specification requirements. It is the supplier's responsibility to ensure that sub-tier suppliers have acceptable quality systems and are meeting all Otis and supplier requirements.

Product development: Advanced quality planning methods shall be used for product development and product transitions (including sub-tier suppliers) and should be in accordance with the most recent revisions of the Advanced Product Quality Planning (APQP) and Control Plan manuals published by the Automotive Industry Action Group (AIAG), or their VDA equivalents.

Product quality: The Production Part Approval Process (PPAP) is used by OTIS as the basis to validate that the supplier meets all OTIS requirements, and the process is capable of consistently producing spec-compliant product (including run-at-rate studies when required).

Production release: OTIS will identify specific part PPAP requirements. A Parts Source Warrant (PSW), in which the supplier attests to meeting all OTIS requirements, must be submitted and approved by OTIS prior to release of production product (this can be a full or interim approval).

Product & process changes: Changes to any aspect of the supplier's product or process, including changes related to sub-tier suppliers, shall be managed to prevent interruptions and quality problems. OTIS shall be notified of all such changes in advance by the supplier

making a formal Supplier Change Request (SCR) using the ETQ Reliance platform and must approve the changes prior to implementation by the supplier.

Visual factory: OTIS expects that supplier factories shall be visual workplaces and utilize world-class manufacturing processes, such as 5S, establishing and tracking of process and product metrics, and application of continuous improvement processes and programs.

Training: Supplier employees shall be properly trained and be product/process knowledgeable. A skills matrix for supplier employees and contractors shall be made available to OTIS upon request.

Defective product: OTIS shall be notified of all supplier-identified nonconformities within 24 hours using the RRCA module in ETQ Reliance. All nonconformities shall be tracked using the 8D or DIVE tools in the RRCA module and closure is expected within 30 days unless another timeline is agreed to in writing by the purchasing OTIS location(s). At no time is a supplier allowed to ship known nonconforming product without prior written approval from OTIS.

Cost of poor quality: Costs incurred by OTIS because of a supplier delivering defective product shall be the responsibility of the supplier. This includes the costs of initial containment.

Epidemic quality problem: Epidemic quality problems indicating a failure of the quality system shall require an OTIS-approved third party to be retained at the supplier's expense to over-inspect product, assess the quality system, and recommend a quality improvement plan to be implemented by the supplier.

OTIS Key Characteristics: OTIS will document key characteristics in its technical data. Suppliers with design responsibility are required to identify key characteristics of the product or process beyond those defined by OTIS.

Supplier Performance: OTIS's Supplier Premier Program is a method to measure supplier performance and collaboratively drive performance improvements. All suppliers are expected to be at the "Performing" level. Suppliers not operating at the "Performing" level shall prepare a Supplier Customer Improvement Plan (SCIP) for review with OTIS and may be subject to Supplier Escalation.

OTIS Supplier Code of Conduct: Suppliers are to comply with the OTIS Code of Conduct, available from any Otis purchasing contact or on the OTIS website: https://www.otis.com/en/us/supplier-code-of-conduct .

Deviations to Requirements: Any exceptions to this Supplier Quality Manual or its exhibits require prior approval via a formal Supplier Deviation Request (SDR) using the ETQ Reliance platform.

Escalation: The Otis escalation process is enforced across all businesses and is based on supplier responsiveness and impact to OTIS' ability to meet customer requirements. The escalation process may include consequences for the suppliers with measures to be taken. Escalation shall be triggered upon exceeding thresholds for performance or in situations where supplier nonconformities have a critical impact on OTIS or our customers. OTIS reserves the right to take appropriate measures as part of supplier escalation, including third party quality monitoring at the cost of the supplier, new business hold or de-sourcing should

the supplier fail to correct, or in the event a supplier demonstrates a pattern of violating requirements outlined in this Supplier Quality Manual.

Receipt & Acknowledgement of Supplier

The undersigned acknowledges receipt and acknowledgement of the OTIS Supplier Quality Manual, effective 1 November 2022.

	Quality	Sales	Manufacturing	Senior Executive
Name				
Title				
Phone				
Email				

Supplier Name

Authorized Supplier Representative

Signature

Date

Table of Contents

1 Definitions and Abbreviations

8D A problem solving process developed by Ford Motor Company; OTIS has adopted the 8D process as one of two problem solving approaches that may be used to document RRCA of supplier nonconformities. Note: earlier versions of the OTIS Supplier Quality Manual referred to a Corrective Action Report (CAR), which has been superseded by 8D .

Alternate Means of Control (AMC) Types of quality controls that might be required when noted on OTIS drawings or specifications. AMC is typically implemented when the product or process cannot be certified through traditional statistical process control approaches. Examples of AMC controls include enhanced part traceability, over-inspection of parts, and 100% inspection of parts by a certified operator/inspector.

Capability The maximum amount of variation inherent in a manufacturing process. "Improving process capability" involves taking steps to limit the amount of variation to defined acceptable limits.

Capability Index The comparison of available tolerance to the portion of the tolerance consumed by a process in a state of statistical control.

C_{pk} The capability index, which accounts for process centering and is defined as the minimum of CP Upper (C_{pu}) and CP Lower (C_{pl}). It relates the scaled distance between the process mean and the closest specification limit to half the process spread.

C_{pl} Measures how close the process mean is running to the lower specification limit.

C_{pu} Measures how close the process mean is running to the upper specification limit.

Control Plan (CP) Methodology for controlling parts and processes to ensure all process outputs remain in a state of control. The plan is used and maintained throughout the product life cycle and is responsive to changing process conditions via written descriptions of the actions that are required at each phase of the process from receiving through shipping.

Commercial Off The Shelf items (COTS) Standard commercial off the shelf or catalog items selected from a supplier's standard line of parts where OTIS does not have design control and OTIS does not have a dedicated drawing or purchased part specification. COTS items are not tooled specifically for OTIS and are used by multiple industries/customers.

Critical Item Any component, material, assembly, or complete system which is selected for production and field traceability to satisfy safety reporting requirements or to support reliability analysis of high cost / high interest items.

Deliverable Software All software intended to be used in OTIS saleable product, including but not limited to software embedded in deliverable hardware and deliverable firmware.

Directed-buy Source Any sub-tier supplier providing material, components, software, or services which has been designated to be used by OTIS.

Domestic Supplier A supplier that provides parts and/or services only to OTIS receiving site(s) in the same country as the supplier is located.

Epidemic quality problem Epidemic quality problems indicate a systemic quality system failure. Epidemic quality problems shall require an OTIS-approved third party to be retained at the supplier's expense to over-inspect product, assess the quality system, and recommend a quality improvement plan to be implemented by the supplier.

Failure Mode and Effects Analysis (FMEA) A preventive analytical technique to methodically study the cause and effects of potential failures in a product or a process. The product or process is examined for all the ways in which a failure can occur. For each potential failure, an assessment is made of its effect on the system and its seriousness, and a review is made of the action being taken (or planned) to minimize the probability of failure or to minimize the effects of the failure.

Gage Repeatability and Reproducibility (Gage R&R) The evaluation of a gauging instrument's accuracy by determining whether the measurements taken with it are repeatable and reproducible.

Global Supplier A supplier that provides production material and/or services to OTIS receiving sites in more than one country or a supplier that has been individually designated as a Global Supplier by OTIS Supply Chain Management.

Key Characteristic (KC) Any feature of a material, process, part, assembly, or test, whose variation within or outside the specified requirement has a significant influence on product fit, form, function or other expected deliverable, and thus must be controlled within prescribed acceptance limits via Process Certification practices.

Key Process Inputs (KPI) A subset of the process inputs or their characteristics that are key to running the process and producing the right product/output.

Key Product Characteristic (KPC) KPCs are product features that are indicated on the drawing and or related documentation by engineering. These features are typically critical to safety, critical to function, and (by exception) critical to process features of the product that must be controlled within prescribed acceptance limits via Process Certification.

Layered Process Audits (LPA) A system of manufacturing process audits performed by multiple levels of management. Key process characteristics are audited frequently to verify conformance to processing standards and assure performance output is to expected levels.

Major Disruption Escape (MD) A supplier-responsible event that causes a significant impact to Otis' ability to meet customer, safety, delivery, productivity, or quality requirements. Examples of Major Disruptions include but are but not limited to: a missed shipment to an OTIS customer, a production line stoppage in an OTIS factory, a field stoppage during installation, or an elevator shut down after handover during the Quality Observation Period.

Nonconforming Product / Service Non-fulfillment of an intended requirement for reasonable expectation for use, including safety considerations.

On Time Delivery % The number of Purchase Order line items delivered on time to the required date and quantity divided by the number of total Purchase Order line items required.

OTIS Operating System A customer focused, process-based methodology for achieving higher levels of customer satisfaction and business performance.

Parts Per Million (PPM) A measurement of the defect rate in a product, calculated as: PPM = (Total number of defective parts/Total number of parts received) x 1,000,000.

Part Submission Warrant (PSW) The warrant contains supplier, part information, required documentation, the supplier application warrant and OTIS disposition. The submission approval by OTIS authorizes the supplier to start production.

Process Capability The range over which the natural variation of a process occurs as determined by the system of common causes. Process capability has three important components:

- Design specification.
- Centering of the natural variation.
- Range or spread of the variation.

The importance of process capability is in assessing the relationship between the natural variations of a process and the design specifications. This relationship is often quantified by process capability indices; the most common of these is C_{pk}.

Process Certification (ProCert) OTIS's methodology to achieve and sustain statistically controlled and capable processes for manufacturing, business, support, maintenance, assembly, and test.

Production Material and Services Includes parts, components or raw material that are directly used in the manufacture of OTIS products; supplier-designed products

that are incorporated into an OTIS assembly/product; and finished goods branded by OTIS.

Production Part Approval Process (PPAP) A process which defines the generic requirements for production part approval. The purpose of PPAP is to determine if all customer engineering design record and specification requirements are properly understood by the supplier and that the process has the potential to produce product consistently meeting these requirements during an actual production run at the quoted production rate. It is expected that the PPAP will be applied both to sub-tier suppliers as well as for OTIS.

Q-Plus (Q+) An OTIS-developed quality management standard whereby suppliers are rated at one of four levels of compliance.

Relentless Root Cause Analysis (RRCA) Root cause analysis for a supplier nonconformity using the 8D methodology

Repeatability Assesses the variation in a measurement system caused by the combined sources of measurement variation of a gage or test equipment when used by one operator or under one set of environmental conditions.

Reproducibility Variation in measurement averages when more than one operator or set of environmental conditions are imposed on the gage or piece of test equipment.

RRCA Lag A measurement of the supplier's responsiveness to product nonconformities, defined as lag (in days) from the agreed-upon DIVE or 8D completion timeline.

Supplier Change Request (SCR) A workflow initiated by the supplier that is used to document and request approval for any permanent product or process deviation.

Supplier Deviation Request (SDR) A workflow initiated by the supplier that is used to document and request approval for any temporary/limited product or process deviation.

Supplier Health Assessment (SHA) An OTIS-developed system to assess risk in the supply base. It is applied for all type of suppliers. Requirements are divided into four major categories: Lean, Process Management, Quality and Resource Management.

Supplier Premier Program The OTIS supplier performance management program that monitors overall supplier quality and performance and drives improvements. Suppliers not meeting the OTIS expectation of a "Performing" or higher classification are expected to prepare a Supplier-Customer Improvement Plan for review and immediate implementation and may be subject to supplier escalation.

Work Transitions Work Transitions are any movement of production from one manufacturing plant to another.

2 Reference Materials

It is the responsibility of the supplier to ensure that they are working to the **latest version** of specifications referenced within this document as well as all Purchase Order requirements.

The publications listed below provide additional information concerning quality assurance processes and techniques discussed in this manual and are available to suppliers through their OTIS contacts. They are also available at the OTIS internet site for suppliers: https://www.otis.com/en/us/contact/information-for-suppliers/

- Business Gifts from Suppliers, OTIS Ethics Brochure.
- The Giving and Receiving of Business Gifts, OTIS Ethics Brochure.

The following publications are available from the Automotive Industry Action Group (AIAG).
These may be ordered on-line at: http://www.aiag.org

- Advanced Product Quality Planning (APQP) and Control Plan (CP).
- Measurement System Analysis (MSA).
- Potential Failure Mode and Effects Analysis (FMEA).
- Production Part Approval Process (PPAP).
- Statistical Process Control (SPC).

The following standards are specific to the elevator / escalator industry. The list is not all-inclusive. Suppliers are additionally responsible for ensuring they understand and meet all local regulatory standards.

- ASME A17.1/CSA B44: Safety Code for Elevators & Escalators
- ASME A17.3: Safety Code for Existing Elevators & Escalators
- ASME A17.5/CSA B44.1: Elevator and Escalator Electrical Equipment
- ASME A17.6: Standard for Elevator Suspension, Compensation, and Governor Systems
- ASME A17.6: Performance-Based Safety Code for Elevators and Escalators
- Building Standard Law of Japan (BSLJ)
- EN 81-20: Safety rules for the construction and installation of lifts - Lifts for the transport of persons and goods - Part 20: Passenger and goods passenger lifts
- EN 81-50: Safety rules for the construction and installation of lifts – Examinations and tests – Part 50: Design rules, calculations, examinations, and tests of lift components
- EN 115-1: Safety of escalators and moving walks - Construction and installation
- GB 7588: Safety Code on Lift Manufacturing and Installation – China
- ISO/TS 14798: Lifts (elevators), Escalators and passenger conveyors-Risk Analysis Methodology
- NFPA 70: National Electrical Code
- NFPA 72: National Fire Alarm and Signaling Code

3 OTIS Quality Policy

Otis is committed to delivering on-time, defect-free products and services, every day, in every market, throughout the full product lifecycle. This continuous commitment guides the actions of our employees, suppliers and partners to never compromise on safety, compliance, or quality. Our goal is to be the most trusted provider of solutions for customers and passengers in the industries we serve.

Suppliers play an integral role in ensuring the quality and cost effectiveness of OTIS products and shall comply with all requirements defined in this manual or otherwise communicated by OTIS.

4 Purpose

This manual defines initial and on-going requirements for supplier quality systems and performance.

5 Scope

This Supplier Quality Manual applies to all suppliers that provide production material, deliverable software, supplier-designed products which are incorporated into an OTIS assembly/product, finished goods branded by OTIS, and product-related services to OTIS facilities. Further, the SQM applies to internal suppliers within OTIS; i.e. OTIS-owned suppliers and Joint Ventures (JVs).

Individual OTIS receiving sites may have additional requirements and will establish specific processes for carrying out these requirements. If a conflict exists between the requirements presented in this manual and individual plant requirements, the more stringent requirement shall apply.

6 Expectations

6.1 Specifications and Requirements Compliance

Purchased products and product-related services shall comply with established specifications and requirements, including:

- Drawings that apply to the specific product or service.
- Engineering specifications and/or reliability requirements that apply to the commodity or specific part.
- Material specifications that apply to the product or service
- Applicable Regulatory / Industry standards.

- OTIS approved changes or deviations.
- Established Commercial Agreements

6.2 Supplier Operating Requirements

Suppliers are expected to:

- Demonstrate and maintain compliance to, all documented requirements, including design performance, reliability, process control, and capability.
- Provide resources to participate in product quality planning
- Have a change control system that reacts to changes in a timely and accurate fashion. In all cases, acquire written approval prior to implementing any change that may impact form, fit, function, interchangeability, or reliability. This shall include manufacturing processes, quality standards for product acceptance, and testing requirements.
- Have a documented quality system in place which addresses all stages of product/process development, manufacturing, and delivery. Suppliers must agree to on-site quality system assessments and validation as requested.
- Maintain process, product, and service documentation.
- Deploy expectations and controls equivalent to those presented in this document to sub-tier supply chain.
- Be accountable for quality of all sub-tier suppliers including "directed-buy" sources.
- Maintain the expertise and resources to perform effective root cause analysis and implement timely corrective and preventive action.
- Provide notification of any and all situations that may negatively impact the supplied product's quality, reliability, and safety; design and/or production; or any other matter described in this manual.
- Be accountable for the impact of poor quality on OTIS and its customers.
- Notify OTIS of any condition or change that has impact on OTIS's environmental commitments or regulatory requirements.
- Fully comply with the OTIS Code of Ethics and Supplier Code of Conduct.
- Maintain a self-audit system which ensures compliance of all the above.

6.3 Supplier Quality Activities

All suppliers shall use the web-based Quality Management Software System (QMSS) provided by OTIS on the ETQ Reliance platform, accessed at:

https://otis.etq.com/prod/rel/#/app/auth/login

Suppliers shall complete the supplier quality activities listed in Table 1 using the web-based applications on ETQ Reliance. Supplier user accounts for ETQ Reliance will be created upon request. Training and user guides for ETQ Reliance are available from your OTIS Supplier Quality Assurance/Supplier Quality Engineering (SQA/SQE) contact.

Table 1 – OTIS Applications on the ETQ Reliance Platform

Application in ETQ Reliance	Section of OTIS Supplier Quality Manual
Production Part Approval Process (PPAP)	8 Production Part & Process Qualification Requirements
RRCA	10.4 Nonconformity management – RRCA
Supplier Deviation (SDR) and Change Requests	11.3 Supplier Deviation Request (SDR) 11.4 Supplier Change Request (SCR)

OTIS reserves the right to request that sub-tier suppliers and distributors use the ETQ Reliance platform for these supplier quality activities.

6.4 Communications

6.4.1 Points of Contact

In general, the following points of contact shall be used:

- ***Primary Contact*** - For all issues regarding supply chain and procurement activity, contact the purchasing contact/Buyer at the receiving OTIS site
- ***Product/Part Quality*** - For all issues regarding product quality, contact Supplier Quality Assurance/Supplier Quality Engineering (SQA/SQE) personnel at the receiving OTIS site
- ***Ethics concerns*** - OTIS maintains a communications channel for suppliers who have questions or issues related to the Code of Ethics. The following link is accessible for suppliers to make direct contact with an independent ombudsman to assist in resolving concerns related to ethics. https://www.otis.com/en/us/contact/information-for-suppliers/

6.4.2 Language Requirements

For Global Suppliers, all supplier quality-related communication with OTIS shall be conducted in English, including electronic entries and uploaded documents on the OTIS ETQ Reliance platform. In addition to English, documents may be provided in other language(s) at the discretion of the supplier and/or the receiving OTIS site.

Local language support in ETQ Reliance shall be authorized on a case-by-case basis only.

6.5 Supplier Information

New suppliers to OTIS must provide general information including a list of key supplier contacts by qualifying factory location. New suppliers must also be registered in the RapidRatings system for OTIS to review their Financial Health Rating (FHR®) and other pertinent risk information. Other required information shall be determined by the OTIS Buyer.

7 Supplier Selection & Qualification Requirements

7.1 Supplier Selection

Ability, capacity, integrity, cost/price competitiveness, financial status, geographical locations, historical quality and delivery performance, reliability, quality of product, market feedback and overall customer-supplier relations are factors which govern the evaluation of all sources prior to soliciting quotations and during the tenure of the purchase contract. Through continuous improvement suppliers are expected to produce an improved product, provide higher quality, reduce costs and/or offer other competitive advantages.

The supplier selection process covers the following main areas:

1. Supplier Financial
2. Quality Management System
3. Environmental, Health & Safety
4. Continuous Improvement

Supplier Qualification ensures that the supplier has basic systems in place to produce parts of consistent quality, can reduce cost over time and can perform the various additional duties of a supplier such as corrective action and proper management of sub-tier suppliers.

Part or service process qualifications ensure that the part is capable of meeting OTIS requirements. Process qualifications ensure that the manufacturing process will produce parts or services consistently. Where applicable, suppliers shall also comply with all OTIS E-3 requirements (see Table 3).

7.2 Quality System

All suppliers shall maintain an effective documented quality system that communicates, identifies, coordinates, and controls all key activities necessary to design, develop, produce, and deliver a quality product or service. **All suppliers must be certified/registered to one of the following international quality management standards** by a recognized independent certified 3rd party registrar:

- ISO 9001
- IATF 16949
- SAE AS9100
- VDA 6.1

Exceptions to maintaining 3rd party registration shall be managed on a case-by-case basis. An OTIS factory quality manager, with concurrence from all other OTIS sites using this same supplier location, may waive 3rd party registration. In such cases the SHA or Q+ self-assessment **must** be completed with an on-site verification visit. Suppliers may be required to reimburse OTIS for the cost of conducting these verification activities.

OTIS reserves the right to:

- Verify Supplier quality systems with an on-site audit.

- Verify a supplier's compliance to an applicable quality standard.
- Conduct the SHA or Q+ self-assessment in lieu of, and/or in addition to, third party certification.
- Disqualify suppliers based on substandard performance and/or unresolved epidemic quality problems. In such cases, full requalification and a supplier executive review will be required prior to resuming business.

Suppliers shall notify OTIS immediately if their third-party registration expires without renewal or is revoked.

7.3 Quality System/Supplier Risk Assessment

Supplier Health Assessment (SHA) is the OTIS program dedicated to assessing risk in the supply base. It is applied for production, distribution and service suppliers in production parts and non-product areas. It is a web based self-assessment questionnaire which can be followed by an on-site validation audit. SHA assesses the supplier in 4 major categories: Lean, Process Management, Quality and Resources Management and assist the supplier to identify strengths, weaknesses, and/or areas requiring improvement.

Additionally, Q+ is the quality systems assessment/survey used by OTIS. It consists of a self-assessment and an on-site audit conducted by OTIS. This may be used by OTIS in situations referenced in section 7.2.

Both the SHA/Q+ Self-Assessment and Survey criteria are intended to assess a supplier's quality system and process control capability, as well as assist in identifying the supplier's strengths, weaknesses, and/or areas requiring improvement.

7.3.1 SHA/ Q+ Self-Assessment

When required, the self-assessment shall be completed by suppliers independently and evaluated by OTIS. Suppliers completing self-assessments shall submit action plans to improve any category or question not meeting minimum requirements. OTIS reserves the right to perform an on-site SHA or Q+ verification visit based on the results of self-assessments.

7.3.2 SHA/Q+ Validation Audit

An on-site verification consists of various quality system and process control categories and is intended to provide a fair appraisal of the supplier's quality system, process controls, and commitment to quality at the time of the survey. Additionally, the SHA on-site audit is required for confirmation for suppliers applying for Premier Supplier status. The audit will be performed by certified SHA auditor registered in the OTIS certified auditors list.

OTIS reserves the right to revise the SHA/Q+ questions to incorporate new requirements.

7.4 Process Audits

OTIS may conduct a process qualification audit at the supplier's manufacturing facility. This audit focuses on the specific process quality controls that the supplier has in place for the products being manufactured for OTIS, as well as part/commodity-specific process requirements. Wherever feasible processes should include mistake proofing solutions. Additionally, all in process production repair processes must be reviewed and approved by Otis.

Additionally, OTIS reserves the right to conduct such an audit at sub-tier suppliers.

8 Production Part & Process Qualification Requirements

8.1 General Requirements

Part Qualification ensures that the part is capable of meeting technical/performance requirements. Process Qualification ensures that the specific manufacturing processes in place will produce a part of consistent and acceptable quality.

All production part sample submissions shall be in accordance with Production Part Approval Process (PPAP). General requirements for each PPAP level can be found in Appendix A – PPAP Requirements.

The receiving OTIS site will define a PPAP level 1-5 to be submitted by the supplier. PPAP requests shall be made using PPAP module on the ETQ Reliance platform. PPAP submission should be made as far in advance of production start-up as possible, working to a date agreed to with the receiving OTIS site.

NOTE: Commercial Off-The-Shelf items (COTS), when meeting the definition provided in section 1, may not require PPAP submission. Suppliers of COTS should contact their specific OTIS site(s) to ensure compliance with local requirements. Any PPAP waiver must be approved by OTIS engineering and quality as well as the receiving OTIS site(s).

NOTE: Check with the receiving OTIS site for any specific timing guidelines for PPAP submission.

Suppliers shall not ship production parts until a Full or Interim approval is received from OTIS via an approved Parts Submission Warrant (PSW). In the case where Full approval is not granted, OTIS will advise the supplier of the areas of concern and the supplier must make corrections and resubmit.

At OTIS's discretion, any or all PPAP items may be reviewed on-site at the supplier's facility as part of a process qualification audit. Such audits shall not relieve the supplier of their responsibility to produce and deliver defect-free parts.

8.2 PPAP Validity

Unless otherwise specified on the PSW, approval is valid for the life of the contract or until revoked by OTIS.

Additionally, **should one of the following conditions occur, the PPAP is no longer valid**, and the supplier must notify OTIS prior to any further production shipments:

- Correction of a discrepancy on a previously shipped part.
- Product modified by an engineering change to design records, specifications, or material on an approved Product Change Authorization (PCA).
- Use of an optional process or material than was used in a previously approved part.
- 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 subcontracted parts, materials, or services (for example, heat treating, plating)
- Product re-released after the tooling has been inactive for volume production for twelve (12) months or more.
- Following an OTIS request to suspend shipment due to a supplier quality concern.
- Any other activity that will result in a change to the supplier's Control Plan (CP)
- Loss or revocation of 3rd party quality system registration.
- Any in production repair process implemented along with repair quality criteria

The supplier shall utilize the Supplier Deviation Request (SDR) or Supplier Change Request (SCR) workflow on the ETQ Reliance platform to notify and request OTIS approval should any of the above events occur. As part of the SDR/SCR review process, OTIS may require requalification of the product with submission of a new PPAP. Should resubmission be required, the receiving OTIS site will determine the PPAP submission level and communicate this requirement to the supplier.

Note: Level 3 is the default PPAP submission level unless otherwise specified by the OTIS SQE. PPAP documentation must be retained per the table in

Appendix A – PPAP Requirements, *and Section 12 Traceability & Quality Records.*

Without exception, written Full or Interim approval of a PPAP must be granted by OTIS prior to the first production shipment.

8.2.1 PPAP Level

OTIS requires part approval to one of five different levels (1-5), depending on the purpose for the PPAP submission. These levels are defined in Table 2 below.

Table 2 - PPAP Level Definitions

Level 1	Part Submission Warrant (PSW) only submitted to the customer.
Level 2	PSW with product samples and limited supporting data.
Level 3	PSW with product samples and complete supporting data.
Level 4	PSW and other requirements as defined by the customer.
Level 5	PSW with product samples and complete supporting data available for review at the supplier's manufacturing location

8.3 E-3 Requirements

To ensure that safety components meet all regulatory and Otis requirements, the E-3 policy requires the design, qualification, and/or manufacturing control processes of the components listed in Table 3 below meet more stringent quality requirements. Specific requirements include but are not limited to quarterly E3 Audits, enhanced traceability requirements, and annual compliance attestations. For more information regarding E-3 requirements please contact your Otis representative.

Otis reserves the right to witness/inspect all records related to E3 requirements compliance.

Table 3 - Products requiring compliance to E-3 Policy

Elevator	Escalator / Moving Walks
Safety gear (car & counterweight)	Steps / pallets
Over-speed governors	Main drive chains
Buffers	Main drive
PESSRAL	Machines

9 Process Certification

Process Certification (ProCert) is the OTIS methodology to achieve and sustain statistically controlled and capable processes for manufacturing, business, support, maintenance, assembly, and test. ProCert follows a prescribed methodology which employs a set of standard quality tools to stabilize process output, reduce its variation, and drive continuous improvement.

Suppliers are required to implement ProCert in their manufacturing processes to address all key characteristics defined by OTIS. Other methodologies that are similar to ProCert may be used when approved by OTIS, providing they meet the requirements outlined in Appendix 2.

Suppliers are encouraged to identify additional key characteristics beyond those defined by OTIS. This should take into consideration, finished part characteristics, upstream product characteristics and process parameters controls. *Note: Suppliers with design responsibility must identify additional key characteristics.*

All identified key characteristics must meet the process certification requirements, or other similar approved methodologies, as defined in Appendix B – Process Certification (ProCert). All KC's must achieve Milestone 4 (Certified KCs/KPCs) at the time of PPAP submission. At a minimum, Milestone 3 (Process Control) may be accepted at PPAP submission, contingent on an OTIS-approved containment plan. On-going control for all KCs must use Statistical Process Control (SPC) or approved mistake proofs. The type and frequency of SPC or mistake proof shall be documented on the Control Plan and agreed to with the receiving OTIS site(s).

All gages used to evaluate and control Key Characteristics must demonstrate adequate repeatability and reproducibility.

Note: Suppliers will be requested to submit ProCert data to OTIS; specific submission requirements will be communicated through the assigned OTIS Quality representative.

9.1 Key Characteristic (KC)

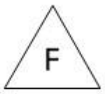
A Key Characteristic (KC) is any feature of a material, process, part, assembly, or test, whose variation within or outside the specified requirement has a significant influence on product fit, performance, service life, manufacturability, information, service or other expected deliverable.

OTIS will define the key characteristics which the supplier needs to certify. Key Product Characteristics (KPC's) will be communicated through various methods, including:

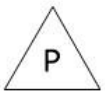
- Notations and/or symbols documented on OTIS engineering drawings and specifications
- Written communication based on known process issues, production problems or field problems.

The various symbols used on OTIS documents to signify key product characteristics are shown below:

SAFETY- A feature is classified as Critical to Safety if it creates a substantial risk of injury, property damage, illness, product damage, environmental damage, and or contamination, if not produced within its prescribed acceptance limits



FUNCTION- A feature will be classified as Critical to Function if it can lead to significant reliability problems, performance issues or probable cause for rendering unit inoperable or not meeting customer requirements, and expectations if not produced within its prescribed acceptance limits.



PROCESS- A product feature identified by manufacturing and determined to be of high risk due to number of producers or it's variation within prescribed limits has a significant impact on the ability of the part, component, unit, or options to meet fit, assembly, installation, or test requirements.

Additionally, some older drawings may contain other symbols to denote key characteristics. Refer to Appendix B – Process Certification (ProCert) for further information on legacy symbols.

Note: KCs identified on the drawing/design specification using symbols X, F and P are called KPCs (Key Product Characteristics). All ProCert requirements for KCs equally apply to KPCs.

9.2 Alternate Means of Control (AMC)

AMC (Alternate Means of Control) are types of quality controls that might be required when noted on OTIS drawings or specifications. When drawings/specifications identify features and/or conditions that require specific AMC controls, the producer will be provided with detailed instructions from the OTIS ordering entity as to what is the required AMC method as well as how records and objective evidence of compliance is maintained.

Examples of AMC controls may include, but are not limited to:

- Traceability- Products, Components, Material
- Over-inspection of parts
- 100% Inspection by a Certified Operator or Inspector
- Certificate of Conformance or Material Certification
- In-process Mistake Proofs

The steps suppliers will be asked to complete as part of AMC can be found in Appendix C – Alternate Means of Control (AMC).

9.3 Process Audits

To assure on-going integrity of ProCert and AMC efforts, suppliers shall conduct periodic internal process audits to ensure continued conformance with standard work instructions, control plans and process stability/ capability. Compliance with implemented process controls and verification of mistake proofs must be included in the audit. **Otis reserves the right to review suppliers' internal process audit reports.**

10 Nonconforming Product

Under no circumstances shall a supplier ship non-conforming product without first receiving written authorization from OTIS. The following sections identify and explain key quality requirements that are applicable for non-conforming product.

10.1 Warranty and Cost Recovery

Specific warranty obligations of suppliers are provided in the OTIS PO terms and conditions or the Commercial Contract between the supplier and OTIS. Suppliers may be may also be liable for certain costs, expenses and liabilities associated with their supply of parts to Otis. Otis will charge its suppliers based on local rates of the affected Otis manufacturing location or service branch.

Potential cost recovery charge-backs to external suppliers include but are not limited to:

- Rework/Repair Premium Freight Costs including Air Charter
- Overtime to Avoid Production Interruption
- Production Downtime for Otis
- Disposition of Scrap
- Sorting of Suspect Material In-House, or in the field
- On-Line Containment Location or Third-Party Warehouse
- Tear-Down (Minor, Major or Complete)
- Contractor Costs
- Outside Lab Testing
- Customer Returns and charges (incl. Warranty)
- Delays in Complete PPAP Submission
- Receiving Inspection, Material Handling, Freight (incl. rejected PPAPs)
- Salaried Employee Expenses (above and beyond)
- Travel
- Presence of a Forbidden Substance

10.2 Supplier-identified Nonconformity

The supplier may find, through their quality control processes or from reports by other customers, products which were produced outside of specifications. The supplier is expected to immediately:

- Segregate these products and determine if this error may have occurred, undetected, in earlier production.
- In any of the following situations, notify OTIS and request approval for a supplier deviation utilizing the Supplier Deviation Request (SDR) module in ETQ Reliance:
    - If the nonconformity affects form, fit or function of the part,
    - If there is likelihood that nonconforming product had 'escaped' the factory.
    - If the nonconforming product will affect deliveries to OTIS.

- In all cases where a report of nonconforming product is received from a customer, where OTIS is using a similar part. The supplier is responsible for the segregation and quarantine of nonconforming material.

- **Nonconforming product shall not be shipped unless a deviation is granted.** Nonconforming product received at OTIS without an approved SDR will be rejected and returned to the supplier with all extra handling and shipping costs incurred by the supplier. No nonconforming product will be processed until a deviation is approved by all required OTIS receiving sites and functions.

10.3 OTIS-identified Nonconformity

The following sections describe required activities when non-conforming material is discovered by OTIS.

10.3.1 Nonconformity Found Prior to Release to Customer

In the event supplier-responsible nonconformities are discovered by OTIS prior to release to the customer, the parts/components in question will be identified and segregated to preclude further use.

The evaluation of the nonconformity will determine whether:

- Defective product is accumulated and returned to suppliers in accordance with receiving site procedures.
- Supplier sorts defects at OTIS receiving site(s).
- Supplier reworks defects at OTIS receiving site(s).
- Supplier contracts third party to complete inspections at OTIS receiving site(s) or at a local off-site location.
- Contingent on contract specifics, OTIS reworks defect and charges supplier for rework costs.

Suppliers are expected to reimburse OTIS for all costs associated with quality escapes, including but not limited to a minimum standard charge for processing each escape.

Suppliers whose defect rate (PPM) exceeds the Performing level requirements (see section 13) shall be required to submit a formal improvement plan and/or enter the OTIS supplier escalation program. In addition, OTIS may require third party inspection to be implemented at the supplier's expense at an independent location or have supplier representation at the OTIS receiving site(s) to support improvement efforts.

10.3.2 Field Failure

The warranty obligations of suppliers for nonconforming parts discovered in the field, as well as their disposition, shall be specified in the commercial contract in force between the supplier and OTIS.

If a critical field failure issue has been identified, a determination of the next steps in the process will be made based on several criteria including the failure's criticality, quantity, cost, and other factors. Based on this evaluation OTIS may require:

- Defective parts to be repaired/replaced in the field by OTIS.
- Defective parts be repaired/replaced in the field by supplier.
- Product be recalled, and repaired or replaced.

In all cases listed above, suppliers are expected to reimburse OTIS for all costs associated with correcting field failures, and for any other costs imposed on OTIS because of such failures, in accordance with the warranty and cost recovery terms described in section 10.1.

10.4 Nonconformity management – RRCA

The need for the RRCA process to be initiated will be evaluated in terms of potential impact upon production costs, quality costs, performance, reliability, safety, and customer satisfaction. OTIS requires suppliers to submit a formal written corrective action plan to address all supplier-related nonconformities identified at the supplier facility, an Otis site, or in the field using the RRCA module on the OTIS ETQ Reliance platform. When OTIS issues a request for corrective action, the supplier will be notified via an automated e-mail from the RRCA module.

The RRCA module on the ETQ Reliance platform provides two standard options to guide and document the RRCA process of DIVE and 8D. Only 8D shall be used for supplier nonconformities. Whenever feasible, mistake proofing should be incorporated into corrective actions.

Any repair procedures implemented to address non-conformities shall be reviewed and approved by Otis along with the repair quality criteria.

10.4.1 8D

For reference, the 8D process steps are as follows:

D0: Plan - Plan for solving the problem and determine the prerequisites.

D1: Establish the team – Select and establish a team of people with product/process knowledge.

D2: Problem identification - Specify the problem by identifying in quantifiable terms the who, what, where, when, why, how, and how many (5W2H) of the problem.

D3: Interim containment/Short term corrective actions - Define and implement containment actions to isolate the problem from OTIS until permanent corrective action is implemented. This shall include identification of nonconforming material at all locations including but not limited to: in-house at the supplier facility, in-transit, at the OTIS receiving site(s), and at job sites/in service.

D4: Determine, identify, and verify root causes and escape points - Identify all applicable causes that could explain why the problem occurred and identify why the problem was not noticed at the time it occurred. All causes shall be verified or proved. The supplier can use any suitable tool for this process such as 5 Why, Cause and Effect Diagrams, Fishbone Diagram, Shainin Red X, etc.

D5: Choose and verify permanent corrective action(s) for the nonconformity - Identify solutions or actions that will permanently eliminate the root causes and contributing factors. Through preproduction programs, quantitatively confirm that the selected corrective actions will resolve the problem for OTIS.

D6: Implement and validate permanent corrective actions - Define and implement the best corrective actions. Implementation includes listing corrective actions and identifying responsibilities and target dates for each action.

D7: Take preventative measures - The supplier shall modify management systems, operation systems, practices, and procedures to prevent recurrence of this and all similar problems. Such modifications can include but are not limited to process Control Plans, DFMEAs, PFMEAs, work instructions, and inspection procedures.

D8: Team Recognition - Recognize the collective efforts of the team to solve the nonconformity and prevent recurrence.

10.4.2 RRCA requirements and timeline

The supplier response to RRCA (8D) **must** include root cause determination, containment action implementation (short-term corrective action), and permanent (long-term) corrective action implementation. As part of the corrective action, a defined implementation plan with implementation dates must be included, as well as disposition of suspect material. Suppliers are expected to consider mistake-proof solutions as part of all RRCA actions.

For RRCA following the 8D process, the standard timeline for completion and progress is outlined in Table 4 below. This timeline may be modified with the agreement of both the supplier and the receiving OTIS site.

Table 4 – 8D completion timeline

Immediate	Acknowledgement of the nonconformity 8D by the supplier
24 hours	Initial containment (steps D1-D3) shall be communicated with OTIS
5 days	Root cause analysis and corrective action (steps D4-D5) shall be complete and communicated with OTIS
30 days	Permanent corrective action and preventative measures (steps D6-D8) implemented; OTIS closure of 8D

The root cause analysis and corrective action phase (D4-D5) will not be considered

complete until the proposed corrective and preventive actions have been reviewed and approved by OTIS.

11 Change Management

After PPAP approval, suppliers must not make any product or process changes without prior written notification and approval from OTIS. **This requirement also applies to sub-tier suppliers.**

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

The Supplier Deviation Request (SDR) is used to communicate all requests for temporary or limited-duration deviation and process changes, while the Supplier Change Request (SCR) is used to communicate all requests for permanent deviations and process changes. For a permanent product change (SCR), OTIS reserves the right to requalify the product with a new PPAP.

As indicated in Section 6.3, suppliers shall initiate all SDRs and SCRs using the appropriate module in the ETQ Reliance platform.

11.1 Product and Process Changes

Supplier requests are required for any change to the process that varies from what was in place at the time of PPAP approval. OTIS expects suppliers to constantly strive to improve quality and reduce process variation through system improvements. To achieve these goals, suppliers may need to deviate from an approved process on a temporary or permanent basis. Such deviations can be due to design changes or unforeseen circumstances such as changes in equipment/ tooling, changes in critical sub-tier suppliers, etc.
OTIS may require the supplier to maintain a safety stock of product produced under the original processes for a period while process changes are evaluated and verified. Typically, this safety stock can be used later for production upon SDR/SCR approval.

Advance written approval from Otis is required for all changes to a supplier's product and/or process.

- It is the supplier's responsibility to submit a Supplier Change Request (SCR) using the ETQ Reliance platform.
- The supplier shall submit any change request with adequate timing prior to implementation.
- Samples may be required for review and to evaluate any potential impact on the Otis product and/or manufacturing/installation processes.
- All validation costs associated with any supplier change will be at the expense of the supplier.

- Supplier Change Requests and PPAP approval shall be required unless specifically waived in writing.
- Raw material changes **must** have completed validation testing before OTIS will review the request.
- Refer to Section 3.1 of the latest edition AIAG PPAP Manual for "Examples of Changes Requiring Notification."

11.2 Work Transitions

Work transitions from one manufacturing plant to another or from one sub-tier supplier to another require early notification to OTIS through the submission of an SCR. Suppliers making such work transitions shall manage these moves in compliance with OTIS expectations. Such expectations can include but are not limited to maintaining a safety stock, pre- and post-move capability assessment, and requalification of the product by the receiving site.

Specifically for Production Location Changes:

- Suppliers must obtain advance written approval from Otis for ALL production location changes, **including sub-tier supplier location changes**.
- Suppliers are to submit a completed Supplier Change Request (SCR) using the appropriate workflow on the ETQ Reliance platform.
- Suppliers must maintain regular contact with their Otis Supplier Champion and Otis Supplier Quality Engineer to ensure compliance with customer-specific requirements throughout the planning and execution of the transition.
- All equipment moves must be called out and identified in the transition plan.
- Any transition plan must include a production bank/stock to ensure Otis's production and service requirements are not affected.
- An approved PPAP (Level 3 unless otherwise directed) is **required** prior to the shipment of production material from the new location. An Exit PPAP from the prior facility may be required and must be submitted as requested.
- Suppliers will be held responsible for any and all costs and/or other liabilities arising in connection with or related to any production location changes.

11.3 Supplier Deviation Request (SDR)

Prior to any *temporary* change to the product or process, suppliers must submit a Supplier Deviation Request (SDR) to OTIS for review using the workflow on the ETQ Reliance platform.

SDRs require the following information:

- The current process/product
- The proposed deviations/changes
- Proposed test plan for qualification and validation
- The reason for deviations/nonconformances with supporting data

- A fixed quantity of parts or time duration for which the SDR will be in effect
- Detail on traceability of all affected material
- Mitigation plans to address any risks due to the process change/nonconforming product
- Detailed list of part numbers including part description by receiving OTIS site(s)

Discrepant material received at OTIS without an approved SDR will be rejected and returned to the supplier at the supplier's expense with all additional handling and shipping costs incurred by the supplier.

Once approved, all material shipped to OTIS must be accompanied by a copy of the approved SDR. OTIS reserves the right to request a written corrective action plan via a Corrective Action Report (CAR). If approval is not granted, the reason for rejection will be summarized and the supplier notified.

SDRs shall not be used to cover up or replace the lack of proper quality systems or controls at the supplier location. **OTIS views excessive use of SDRs for nonconforming material as an abuse and a potential indicator of an epidemic quality problem.**

11.4 Supplier Change Request (SCR)

Prior to any *permanent* change to the product or process, suppliers must submit a Supplier Change Request (SCR) to OTIS for review using the workflow on the ETQ Reliance platform. This includes SDRs which have exceeded their production part/time limit or have been repeatedly renewed.

SCR required information:

- The current process/product
- The proposed deviations/changes
- Proposed test plan for qualification and validation
- The reason for deviations/nonconformances with supporting data
- Effective date of the change
- Mitigation plans to address any risks due to the process change/non-conforming product
- Detailed list of part numbers, including part description by receiving OTIS site(s)

If approval is not granted, the reason(s) for rejection will be summarized and returned to the supplier for resolution.

Implementation of permanent product/process changes without an approved SCR shall be viewed by OTIS as an indicator of a significant breakdown in the supplier's quality management system.

12 Traceability & Quality Records

12.1 Traceability

Items requiring traceability will be identified during the development phase of a project. Where traceability is required, OTIS will work with suppliers to develop an acceptable system. The requirement for traceability will be communicated to suppliers through specifications and drawings. Purchase Orders will incorporate the requirement.

12.2 Records

Supplier's certification, process, test and/or inspection data shall be provided to OTIS upon request. Records shall be retained by the supplier for a minimum ten (10) year period after delivery of the relevant products. This requirement does not supersede any governmental or regulatory requirements for records retention. Any exceptions should be brought to the attention of OTIS by submitting an SCR. Certain data may be required to be included with product shipment, as agreed-upon between the supplier and the receiving OTIS site.

13 Supplier Performance Management

The Supplier Premier Program (SPP) is OTIS's comprehensive supplier performance management system. The objective of SPP is to facilitate accelerated supplier performance improvements and foster a spirit of collaborative continuous improvement with our valued suppliers. For direct suppliers, the SPP tracks metrics on a monthly basis to determine a supplier's level of performance, with requirements for each performance classification shown in Table 5 below. Suppliers may be selected by OTIS to participate in a periodic supplier assessment and review process in addition to the standard program.

For all suppliers regardless of volume, PPM shall be the metric used to evaluate product quality and OTD shall be the metric used to evaluate delivery performance. As of January 2022, OTIS also applies a Major Disruption (MD) escape metric to capture **any** supplier-responsible disruption or incident that negatively affects the KPIs or operational performance of one or more receiving OTIS sites.

In addition to the SPP metrics described in Table 5, OTIS may track additional supplier-related metrics for informational purposes, including but not limited to: nonconformity closure (RRCA) status, RRCA lag from plan, PPAP completeness, PPAP first-pass yield, and field turnback activity and responsiveness. OTIS reserves the right to modify performance expectations and/or establish additional metrics and performance indicators in the Supplier Premier Program.

Table 5 – OTIS Supplier Premier Program metrics

Level	Delivery	Quality	Major Disruption (MD)*
	OTD	PPM	
Premier	100%	≤ 100	0 in the previous 3 months
Performing	≥ 95%	< 500	
Progressing	> 85%	< 1500	
Underperforming	≤ 85%	≥ 1500	1 in the previous 3 mo. OR 2+ in the previous 12 mo.

Notes:
Performance classification is based on a 3-month rolling average.

** Major Disruption is defined as a supplier-responsible event that causes a significant impact to Otis' ability to meet customer, safety, delivery, productivity, or quality requirements. Examples of Major Disruptions include but are but not limited to: a missed shipment to an OTIS customer, a production line stoppage in an OTIS factory, a field stoppage during installation, or an elevator shut down after handover during the Quality Observation Period.*

All OTIS suppliers are expected to achieve and sustain operations at the "Performing" level at a minimum. Suppliers who are not consistently meeting the requirements to be classified as "Performing" at a minimum shall prepare a Supplier-Customer Improvement Plan (SCIP) for review and immediate implementation. The SCIP template is available from the OTIS Supply Chain Manager, Buyer, or Supplier Quality Engineer.

Selected suppliers may participate in Supplier Premier at the Elevated engagement level, in which a structured supplier performance Assessment and Review process occurs on a semi-annual basis in addition to continuous monitoring of the KPIs described above. Suppliers designated for Elevated engagement will be notified by their OTIS supply chain manager/buyer and provided with additional information about the Assessment and Review workflows.

14 Environment, Health, & Safety

Environment, Health, & Safety is of prime importance to OTIS. It is expected that suppliers will comply with the OTIS EH&S expectations listed below:

- Provide safe working conditions for all employees, customers, and contractors.
- Adhere to all applicable National, Regional, State and Local laws and regulations governing Environment, Health and Safety.
- Operate in a manner that minimizes the impact to the environment.
- Limit the use of natural resources and promote sustainable natural resource practices.

- Communicate and extend these expectations to sub-tier suppliers.

Additional information may be obtained on the "Suppliers" page at OTIS.com: https://www.otis.com/en/us/contact/information-for-suppliers/

Appendix A – PPAP Requirements

The following table details the PPAP documentation and date to be submitted to OTIS or retained by the supplier for each of the PPAP levels.

Table 6 - PPAP requirements by level

PPAP Requirements/Submission Table

		Level 1	Level 2	Level 3	Level 4	Level 5
1	Design Record					
	For proprietary components	R	R	R	R*	R
	For all other components/details	R	S	S	R*	R
2	Engineering Change Documents, if any	R	S	S	R*	R
3	Customer Engineering approval, if required	R	R	S	R*	R
4	Design FMEA	R	R	S	R*	R
5	Process Flow Diagrams	R	R	S	R*	R
6	Process FMEA	R	R	S	R*	R
7	Control Plan	R	R	S	R*	R
8	Measurement Systems Analysis Studies	R	R	S	R*	R
9	Dimensional Results	R	S	S	R*	R
10	Material Performance Test Results	R	S	S	R*	R
11	Initial Process Studies	R	R	S	R*	R
12	Qualified Laboratory Documentation	R	S	S	R*	R
13	Appearance Approval Report (AAR), if applicable	S	S	S	R*	R
14	Sample Product	R	S	S	R*	R
15	Master Sample	R	R	R	R*	R
16	Checking Aids	R	S	S	R*	R
17	Records of Compliance	R	R	S	R*	R
18	Part Submission Warrant (PSW)	S	S	S	S	R

***S** = shall be submitted to OTIS and a copy shall be retained at the supplier location*

***R** = shall be retained by the supplier location and made available to OTIS upon request*

R = shall be retained by the supplier location and submitted to OTIS upon request*

Note: If a Level 4 PPAP is requested, the OTIS requestor must specify, in writing, what documentation/data will be required to accompany the PPAP submission.

PPAP Elements

1. **Design Records**

   A printed copy of the drawing and/or specification, including revision date and revision history, needs to be provided. For an Otis-controlled design, this is a copy of the specification and/or drawing that is sent together with the Purchase Order (PO).

   For a supplier-controlled design, a released specification and/or drawing in the supplier's product data management system will meet the requirement for design records. Ballooned specification/drawing: Supplier must number

each and every feature and requirement on the design record. Feature numbering must correspond with the documented inspection results (including notes, standard tolerance notes and specifications, and anything else relevant to the design of the part).

2. **Authorized Engineering Change Documents** (if applicable)
   If PPAP submission is required while a formal change is in process, an approved Supplier Deviation Request (SDR) must be included.

3. **Engineering Approval**
   If submission is required before OTIS engineering has approved all Engineering qualification tests, an approved Supplier Deviation Request (SDR) must be included.

4. **DFMEA**
   If the supplier has design control, a copy of the Design FMEA (DFMEA), reviewed and signed-off by OTIS Engineering, shall be included. If it is agreed that the DFMEA contains supplier Intellectual Property (IP), the DFMEA may be reviewed with OTIS Engineering and Quality for approval. Where OTIS has design control, the list of all Key Characteristics should be shared with the supplier so they can be addressed on the PFMEA and Control Plan. This would typically take place during a design feasibility review meeting.

5. **Process Flow Diagram**
   A copy of the Process Flow, indicating all steps and sequence in the fabrication process, including incoming components.

6. **PFMEA**
   A copy of the Process Failure Mode and Effect Analysis (PFMEA), reviewed and signed-off by supplier and customer. The PFMEA should address potential failure modes in each step as outlined in the process flow document. [Including packaging and labeling]. All KC and KPC's must be included on the PFMEA.

7. **Control Plan**
   A copy of the Control Plan, reviewed and signed-off by supplier and customer. The Control Plan follows the PFMEA steps. All KC and KPC's must be identified and included on the Control Plan.

8. **Measurement System Analysis Studies (MSA)**
   MSA usually contains the Gage R&R for the Key Characteristics (KCs) and Key Product Characteristics. MSA is required for both variable and attribute features.

9. **Dimensional Results**
   A list of every dimension noted on the ballooned drawing/specification. This list shows the product characteristic, specification, the measurement results and the assessment showing if this dimension is "ok" or "not ok". OTIS will define the quality required for a dimensional layout, typically 3-5 pieces, however this may be adjusted in special circumstances such as multi-cavity tooling.

10. **Records of Material / Performance Tests**
    A summary of every required test performed on the part. Requirements are usually agreed to by Supplier & OTIS during the design feasibility meetings. This summary lists each individual test, when it was performed, the specification, results and the assessment pass/fail. Supporting data to be included as requested, but may be submitted as tests are completed. In addition, this section lists all material certifications (steel, plastics, plating, etc.), as specified on the print/specification. Actual materials certifications are to be included with the submission.

11. **Initial Process Studies**
    This section shows all Statistical Process Control charts affecting the most critical characteristics. The intent is to demonstrate that critical processes have stable variability and that is running near the intended nominal value. All OTIS defined KCs and Supplier defined KPC's must have studies included.

12. **Qualified Laboratory Documentation**
    Copy of all laboratory certifications (e.g. ISO 17025, TS) of the laboratories that performed the tests reported on section 13.

13. **Appearance Approval Report**
    A copy of the AAI (Appearance Approval Inspection) form signed by the customer. Applicable for components affecting appearance only. Requirements for any Appearance Approval Reports should be defined during the Design Review.

14. **Sample Production Parts**
    OTIS will define the number of samples to be submitted with the PPAP. Such samples must be produced as part of the PPAP production run. These samples are to be numbered to correspond to the measurement data submitted with the Dimensional Report.

15. **Master Sample**
    A sample, typically signed off by customer and supplier, that is used to train operators on subjective inspection parameters such as visual appearance or noise

16. **Checking Aids**
    When there are special tools for checking parts, this section shows a drawing of the template or tool and calibration records, including dimensional report of the tool. (CMM programing information may be requested)

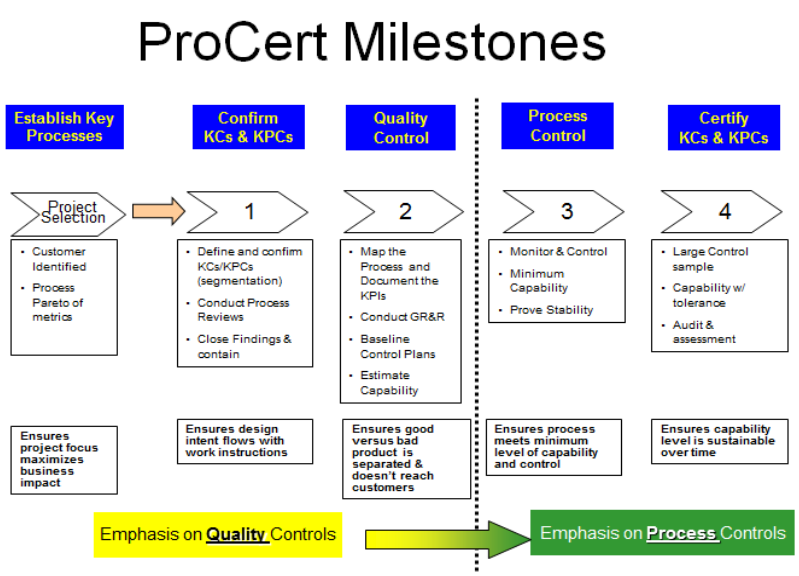
17. **Customer-Specific Requirements**
    OTIS customer may have specific requirements to be included on the PPAP package. It is a good practice to ask the customer for PPAP expectations before even quoting for a job.

18. **Part Submission Warrant (PSW)**
    This form that summarizes the whole PPAP package. The PSW includes part information, the reason for submission and the level of documents submitted to the customer. A Declaration statement must be signed by an authorized person at the Supplier's site making the submission (typically the plant quality

manager). The OTIS using site must disposition the PSW, sign and return to the supplier. The supplier is not authorized for production until they have received a full or interim approved PSW from OTIS.

A PSW is required regardless of PPAP submission level.

Appendix B – Process Certification (ProCert)



Steps to Certify a Process

The following requirements shall be achieved to consider a process / KC certified.

1) Initial steps to implement Process Certification:

- Map the current process steps to identify KPIs and the process KCs that impact the process output and/or KCs identified by OTIS. Refer to Design and Process FMEA's in this step. Identify current process performance or output for each process step.
- Verify and document that the measurement processes used for all variable and attribute KCs are capable (i.e., repeatability, reproducibility, correlation studies, and total process capability).
- Identify controlling actions to maintain process capability and reaction plans for out of control conditions as they occur at the workstation. These should be documented on the control plan and/or work instructions.
- Implement a process monitoring method.
- Implement a Preventive Maintenance Plan.
- Perform self-audits.

2) Variable Measured Characteristics
A process is considered certified when:

- Measurement equipment is qualified (e.g. R&R studies completed)
- Assignable causes for variation have been identified, documented, and removed.
- Process inputs and KCs are identified, monitored, and controlled.
- A minimum of twenty−five (25) consecutive observations or thirty (30) days of output whichever is greater, capturing variability associated with step to step,

piece to piece, set up to set up, time to time, and lot to lot variation, with no non-conformances detected.
- KCs are under statistical control and Cpk of 1.33, or better is demonstrated.
- Routine self-audits being performed

3) Attribute Measured Characteristics

A process is considered certified when:

- Measurement equipment is qualified (e.g. R&R studies completed)
- Assignable causes for variation have been identified, documented and removed.
- Process inputs and KCs are identified, monitored and controlled.
- A minimum of forty−five (45) consecutive observations (90% confidence) or (30) days of output whichever is greater, capturing variability associated with step to step, piece to piece, set up to set up, time to time, and lot to lot variation, with no non-conformances detected.
- Routine self-audits being performed.

Key Characteristics

On some older OTIS drawings / specifications the following symbol may still be used to denote key characteristics.

Business Unit	Legacy Identification Symbols
Otis	CC

Appendix C – Alternate Means of Control (AMC)