Production Part Approval Process

(PPAP) Manual

Welbilt

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34655 Doc. No.

WBT 8501

Rev Date: 4/30/19

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1.0 Introduction

Welbilt [WBT] Quality Management has implemented a modified version of the Production Part Approval Process (PPAP) and has prepared this manual for the WBT Product Lines and suppliers. PPAP is used to approve new or revised products, process, or components.

WBT PPAP Forms Kit

This manual must be used in conjunction with the WBT PPAP Forms Kit which contains forms and instructions for the PPAP process.

Responsibility of the Product Line or Supplier

- ✓ Ship only parts that meet WBT specification requirements and the supplier's design and process records.
- ✓ Notify WBT of any changes to part(s) or process(es).

2.0 Production Part Approval Process (PPAP)

2.1 Purpose

The purpose of the Production Part Approval Process (PPAP) is:

- ✓ To provide the evidence that all WBT engineering design drawings and specifications are properly understood and fulfilled by the manufacturing organization.
- ✓ To demonstrate that the product line or supplier established manufacturing processes have repeatability and reliability to produce product that meet all requirements during an actual production run at the specified production rate.

2.2 When is PPAP Submission Required?

Note: After a submitted PPAP is approved, any changes to the process and part/component must be requested in writing.

In general, a PPAP is required anytime a new product, ***new part or a change to an existing product, part*** **or process is being planned.** WBT sites, with guidance from Global Quality, will determine what level of PPAP submission is required. As a Product Line or supplier, you should have a comprehensive quality system that is capable of fulfilling all of the requirements of a PPAP submission regardless of whether you have been asked to deliver a submission. In the event a PPAP submission is not requested, WBT quality reserves the right to request any of these documents at any time during the life of the product. In addition to a site, WBT Global Quality reserves the right to request a PPAP submission for a variety of reasons including the following.

New parts, process or suppliers:

1. New part or product
2. New supplier
3. New process or technology

Changes to existing product:

1. Change to material or component
2. New, additional or modified tools
3. Upgrade or re-arrangement of existing tools
4. Tooling production or equipment transferred to a different site
5. Change of supplier or non-equivalent materials/services
6. Product when tooling has been inactive for 12 months
7. Product or process changes on the components of the product
8. Change in test or inspection method
9. Bulk material: New source of raw material
10. Change in product appearance attributes
11. Change in production process or method
12. Change of sub-supplier or material source

2.3 Supplier Change Request (SCR) Instructions

Whenever there is a plan to change a part, process, or tooling, WBT approval is required ***prior to initiating any activity***. The SCR is used for initiating all supplier changes and must be pre-approved by WBT Sourcing and Quality before any changes can proceed. Failure to have an approved SCR may affect customer quality and therefore future business opportunities.

The SCR is only for changes that are permanent in nature.

Specification Deviation:
Any temporary change to a print requirement from a supplier must be done using the Specification Deviation Form.

Changes that require notification are outlined in Sect 2.2: Changes to existing product.

2.4 Elements of a PPAP Submission

One or more of the following elements may be required as part of your formal submission depending upon your assigned submission level:

1. Part Submission Warrant (PSW)
2. Design Records & Bubbled part print(s).
3. Approved Engineering Change Documentation
4. Design FMEA
5. Process Flow Diagrams
6. Process FMEA
7. Control Plan
8. Measurement System Analysis Studies
9. Dimensional Results
10. Material, Performance Test Results
11. Initial Process Study (Cpk) Capability Studies or Ppk for existing lot
12. Qualified Laboratory Documentation
13. Appearance Approval Report
14. Sample Product Parts
15. Master Sample
16. Checking Aids
17. WBT Specific Requirements:
    a) Tooling Information Form
    b) Packaging Form
    c) Specification Deviation Form
    d) Supplier Change Request
    e) PPAP Checklist

2.5 Submission Levels

The level to be submitted is determined by the WBT site, and unless otherwise noted always defaults to Level 3 which is a full PPAP submission. There are five submission levels listed below and each is typically applied to the specific areas listed.

Level 1 – Part Submission Warrant only (Applied to non-functional parts and raw bulk material)
Level 2 - Part Submission Warrant with product samples and limiting supporting data. (Applied to catalog or contract manufactured functional product or product with critical material and/or dimensions)
Level 3 - Part Submission Warrant with product samples and complete supporting data. (Applied to critically designed components)
Level 4 – Part Submission Warrant and other requirements as defined by the customer (Applied to special applications)
Level 5 - Part Submission Warrant with product samples and complete supporting data available for review at the supplier's manufacturing location (Applied to critical designs, processes, or changes)

Definition of Levels:

Level 5:

ONSITE REVIEW

As requested from the site or Global Quality PPAP representative for critically designed components, all new parts, designs, or processes, or existing high risk design or processes changes.

Level 4:

SPECIAL APPLICATIONS ONLY

Applied with prior approval from the site or Global Quality PPAP representative.

As requested from the site or Global Quality PPAP representative for parts, designs, or processes, or existing low and medium risk design or processes changes.

Level 3:

CRITICALLY DESIGNED FUNCTIONAL COMPONENT

Components that are critical to the performance and reliability of the equipment that heat, cool, safety, move or control. Component selection requires heavy supplier involvement to fit

the component specifically to the application. e.g. controller, compressor, motor, actuator, complicated fabricated assemblies, oven cavities, fryer pots, griddle assemblies, etc.

ALL NEW PARTS, DESIGNS, PROCESSES
All changes affecting form-fit-function, reliability, or performance. All product resourced to new suppliers, serial production parts, existing high-risk parts undergoing a part number change.

All process changes affecting high risk parts within a product family.

Level 2:
CATALOG OR CONTRACT MANUFACTURED FUNCTIONAL COMPONENT
Functional components that are critical to the performance of the equipment but can be selected from standard offerings based on spec requirements or designed by Engineering for contract manufacturing. Application suitability is validated and confirmed by WBT (e.g. fabrications, special processes (anodizing), refrigeration std. controller, castings, machined parts)

NON-FUNCTIONAL PART WITH CRITICAL MATERIAL/DIMENSION SPECS
Non-functioning parts that may or may not be manufactured to our specific requirements, but the material used and the dimensional tolerances are critical to the design and manufacturability of our equipment. e.g. labels, hardware, aesthetics, sheet steel, insulation, adhesives, Loctite, specific packaging design (pallet, carton), more complicated fabrications with multiple bends or simple subassemblies.

SIMPLE REVISION LEVEL ONLY
Changes or simple print updates not affecting form-fit-function. Applies to low and medium risk parts within a product family.

Level 1:
INDIRECT TYPE ITEMS/PARTS/SERVICES WITH NON-CRITICAL SPECS
Items that are necessary, but specs and tolerances are not critical to production or the performance of the equipment; indirect services. e.g. packaging, industrial gases, maintenance and repair operations (MRO), simple fabricated components.

2.6 PPAP Checklist (see PPAP Forms Kit)

WBT requires the use of the PPAP checklist for referencing and organizing the PPAP submission. Here are the required elements for each LEVEL option 1 through 5.

Element Order	PPAP Requirements Important: Submit your documents in this order.	Level 1	Level 2	Level 3	Level 4	Level 5	Required Documents
1	**Part Submission Warrant (PSW)**	S	S	S	S	R	WBT PSW Required
2	**Design Records & Bubbled Drawing(s)**	R	S	S	AR	R	WBT Site Parts Print
3	**Approved Engineering Change Documentation**	R	SS	S	AR	R	Various engineering documentation; e.g. AR = required for contract manufactured par
4	**Design FMEA**	R	R	S	AR	R	AR = Supplier Format if Supplier is the Design & Development organization.
5	**Process Flow Diagrams**	R	R	S	AR	R	Any standard flowchart format.
6	**Process FMEA**	R	R	S	AR	R	WBTPFMEA Format; e.g. AR = required for contract manufactured part
7	**Control Plan**	R	R	S	AR	R	Must be WBT supplied format; test plans can be supplier format. E.g. AR = required for contract manufactured part
8	**Measurement System Analysis Studies**	R	R	S	AR	R	Statistical package format for gage R&R. E.g. AR = required for contract manufactured part
9	**Dimensional Results**	R	S	S	AR	R	Must be on WBT Dimensional report format; e.g. AR = required for contract manufactured part
10	**Material Performance Test Results, Reliability, or Test Performance**	R	S	S	AR	R	Industry Standard reports or test result formats designated by WBT.
11	**Initial Process Study (Cpk)** ***Capability Studies or (Ppk)***	R	R	S	AR	R	Process Capability or Process Performance Study using a statistical package; e.g. AR = required for contract manufactured part
12	Qualified Laboratory Documentation:	R	S	S	AR	R	Industry certification for the lab
13	**Appearance Approval Report**	S	S	S	AR	R	Supplier form with accompanying material documents if needed; e.g. AR = where appearance is important
14	**Sample Product Parts**	R	S	S	AR	R	Parts tagged in accordance with WBT PPAP reference manual
15	**Master Samples**	R	R	R	AR	R	Comparative samples
16	**Checking Aids**	R	R	R	AR	R	List of checking aids used in production

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2.6 PPAP Checklist (continued):

17	**WBT Specific Requirements**						
A	**Tooling Information Form**	R	R	S	AR	R	WBT Form
B	**Packaging Form**	R	R	S	AR	R	WBT Form
C	**Specification Deviation Form**	R	R	S	AR	R	WBT Form
D	**Supplier Change Request**	R	R	S	AR	R	WBT Form
E	**Supplier PPAP Checklist**	R	R	S	AR	R	WBT (this current) Form

Required for PPAP submission	S			**Not required**
Documents on a case by case basis are marked AR for "As Requested"	AR	IF Applicable	IA	

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2.7 Electronic Submission/Submission Method

WBT requires that all PPAPs be submitted electronically to Global Quality for Product Line submissions, Supply Chain Category Manager and Value Stream Purchasing coordinator for Supplied component submissions prior to the agreed due date.

2.8 Submission Status

The review and approval process will be managed by Global Quality and each WBT site and identified with one of the following submission rankings:

Approved: The submission is acceptable to the guidelines of any and all criteria set forth by the WBT site managing the submission.

Rejected: The submission is not acceptable and needs to be resubmitted for approval. (Note: Submissions with the wrong revision level or part number will be rejected.)

Interim: An interim approval can occur through an agreement with quality management. The product must be deemed "acceptable with deviation" by the WBT site, and the interim *may only be issued for 90 days. The submission must have an approved Specification Deviation that clearly identifies the corrective action plan to achieve full approval within the 90 day period. The Specification Deviation is in the WBT PPAP Forms kit.*

Note: The supplier will be notified by email of the status including any reasons for "Rejected" or "Interim" approval.

Suppliers must not ship parts without "Approval" and any parts manufactured without "Approval" are the responsibility of the supplier.

2.9 Ongoing Requirements

WBT reserves the right to request any information you have provided in any data or documented in any element of approval at any time including after the approval has been granted. WBT reserves the right to require revalidation at any time.

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2.10 Critical to Quality (CTQ) Characteristics

- A critical PART requirement specified on a controlled document (typically an engineering drawing, specification or performance requirements)
- A critical PROCESS requirement identified by Customer or Supplier.
- Directly represents the safety, regulatory, or primary functional performance requirements by the end customer.
- Requires verification of part conformance during first production.
- Requires documented evidence of process control to maintain part conformance through the life of the product

WBT's expectation is that you will address all CTQs in the control plan and ensure that you have a robust process for consistently achieving all CTQ requirements as they are defined in the WBT part print. For the process, an appropriate robust methodology for control will be used. Notification to WBT is required.

CTQ are mandatory for Element 11 the "initial process study." WBT requires capability studies for all CTQs and any process related characteristics that either the supplier or WBT identifies as critical.

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3.0 INSTRUCTIONS FOR COMPLETING A PPAP SUBMISSION

Note: Refer to the WBT PPAP Forms Kit

Element 1: Part Submission Warrant (PSW)

The Part Submission Warrant (PSW) documents the submission and the approval or rejection of purchased parts prior to production. The PSW must be submitted as part of the PPAP at every submission level.

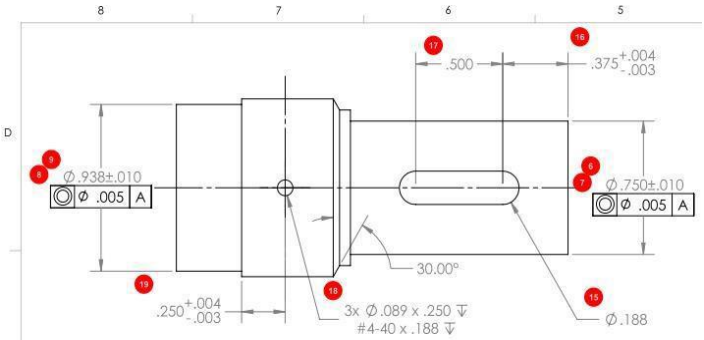
Any fields that do not apply to your submission should be filled in with "N/A" (Not Applicable).

Element 2: Design Records and Ballooned Drawings

Design records and ballooned drawings document the part print and provide any additional engineering records for reference.

A ballooned drawing shows the parts or assemblies in a part print with numbered "balloons" that point to individual dimensions and requirements of the part. The numbers on the ballooned drawing correlate with the numbers found on the Dimensional Data Sheet in the PPAP forms kit. A ballooned drawing must be submitted as part of PPAP for every submission level when there are dimensional results.

Sample Balloon Drawing



Element 3: Approved Engineering Change Documentation)

This section is used to cover anything that is not addressed in a part print such as emails and Supplier Change Requests.

1. WBT ECNs must be approved prior to use.
2. Print change submissions must have current prints.
3. All supplier initiated changes must have a copy WBT approved Supplier Change Request (SCR) form in the forms kit.
4. Emails can only clarify requirements not define them.
5. Emails cannot re-define a requirement in lieu of a print change.

Element 4: Design Failure Mode and Effects Analysis (DFMEA)

The DFMEA shows evidence that potential failure modes and their associated risks have been addressed in order to eliminate or minimize their effects on the design or through product design changes and improvements. The DFMEAmust address all (CTQs) and any potential voice of the customer inputs identified in the WBT Project Scope. WBT has included a template in the forms kit.

The date on the DFMEA should show release prior to print release. Severity, Occurrence and Detection ratings are used when performing FMEA activities.

Any potential failure mode not mitigated in the DFMEA should be included in the PFMEA also included on the PPAP worksheet. Any potential failure mode with a severity ranking of 9 or 10 must be addressed with a corrective action plan. Furthermore, potential failure items in the top 25 percent high RPN ranking must have corrective action items addressing the potential failure mode.

Element 5: Process Flow Diagrams

The Process Flow Diagram documents and clarifies all the steps required in the manufacturing of a part. The Primary process steps must match both the Control plan and the PFMEA. Process flows must include the entire manufacturing process (receiving through shipping) including offline activities (such as measurement, inspection, handling, flow of non-conforming material, and rework parts.

Element 6: Process Failure Mode and Effects Analysis (PFMEA)

The PFMEA is used to show evidence that potential failure modes and risks have been assessed in the manufacturing processes. There is a template in the Forms Kit.

A PFMEA should be performed for every part piece of equipment or process involved in manufacturing. PFMEA is a cross-functional activity that is performed internally, updated routinely and reviewed periodically.

WBT requires that any severity ranking of 9 or 10 be addressed with a corrective action plan. Furthermore, potential failure items in the top 25 percent of the high RPN ranking items must have actions carried over and addressed in the control plan. All critical failure modes must be addressed.

Element 7: Control Plan

A Control Plan defines the operations processes, materials, equipment, methodologies, and CTQs (as determined by WBT and suppliers) for controlling variations in key product or process characteristics integral to the manufacturing process. Its purpose is to communicate the supplier's decisions during the entire manufacturing process from materials purchase through final shipping. Specifically, the control plan should address the following:

- Methods of production
- Identification of CTQ characteristics and controls
- Secondary or outsourced operations
- Materials and their physical and chemical characteristics
- Types of process equipment at each operation
- Types of test equipment used to measure each characteristic
- Specifications sampling strategy, control and reaction methods used
- Periodic product verification

All processes must have a control plan that defines all methods used for process control and complies with the customer-specified requirements. The control plan must clearly state each step in the process; the specification & all Critical to Quality (CTQs) must be addressed for product and process. There is a template in the Forms Kit.

Element 8: Measurement System Analysis (MSA)

MSA helps to understand the measurement process and determines if the process will deliver product that meets the design requirements, which includes:

- Analysis of statistical properties for the measurement tools
- Identification of environmental factors that influence the measurement tools
- Verification of ongoing statistical properties (gage repeatability & reproducibility (GR&R), gage calibration, and gage maintenance)

WBT requires an analysis of the capability of all measurement tools identified in the Control Plan (in process and offline gages). GR&R must be submitted for devices measuring data on CTQs and for each measurement device on all Level 2 ,3, 4 and 5 submissions. The WBT requirement for a GR&R of 10% or less.

Important: Gages with a GR&R of 10 - 30% error require an improvement action plan.

Element 9: Dimensional Results

Document dimensional results in the "Dimensional Data Sheet" provided in the PPAP Tool Kit. The measurements should correlate to the balloon drawing.

These results show conformance to the WBT part print. Non-dimensional requirements (Element 10) should be addressed in the Material and Performance section of the PPAP submission. WBT requires a full dimensional layout of the part on all PPAP submissions for level 2,, 3, 4, and 5 for all drawings related to the part.

The parts used for dimensional data must be randomly sampled from a run at production rate. The dimensional report must address all dimensions, applicable notes with variable dimensions, and dimensions contained on reference prints.

The Method of Measurement must be documented for every CTQ characteristic. The following conditions will result in a requirement being unacceptable:

1. Any specification that is non-conforming
2. Any specification with excessive range and/or variation
3. Any specification that is too close to the tolerance limit(s).

The presence of any of these conditions requires corrective action to be addressed and identified on the Dimensional Data Sheet. The proposed corrective action must address the root cause. PPAP will NOT be approved before the corrective action is implemented.

Element 10: Material, Performance, and Reliability Test Results

Material should be confirmed, and acceptable performance demonstrated. If there is a performance requirement, make sure the results of the testing are acceptable, from a credible source and performed to the specification. These should be reviewed and agreed with WBT engineering prior to testing. Together with the Dimensional Data Sheet this section of the submission should address a complete review of all product specifications and/or part print requirements.

Material Test Results should be provided in a format that allows for clear interpretation and be from an accredited lab to a known standard. It is your responsibility as a supplier to WBT to confirm the composition of your material for both the PPAP submission and ongoing conformance.

WBT engineering or quality will communicate specific material performance, reliability, and/or testing performance requirements in part print. It is the responsibility of the Product Line or supplier to confirm the data and format for this requirement with their WBT Quality representative.

Element 11: Initial Process Study (Cpk, Ppk)

The purpose of initial process studies (Cpk, Ppk) is to determine if the production process manufacture product to the requirements. Initial process studies (capability) are mandatory for all CTQs. There are two primary indexes used in determining process capability.

Cpk Process Capability and Ppk Process Performance

- ✓ Cpk: Measures the process compared to the control limits (On-going)
- ✓ Ppk: Measures the process compared to the CTQ characteristics (Specific Batch)

Note: There is additional information in the PPAP forms kit.

Element 12: Qualified Laboratory Documentation:

Qualified laboratory documentation consists of the industry certifications for any lab that was involved in completing validation testing. This could be for an in-house test lab or any offsite contracted test facilities that were used for validation or material certification testing.

When measurement traceability is required, the measuring devices shall be calibrated or verified at specific intervals prior to use, against a traceable international standard such as ISO/IEC 17025

Element 13: Appearance Approval Report

This requirement should always be in reference to a specific specification such as color, texture, contrast or paint. Given the nature of the foodservice equipment business a variety of stainless steel is utilized. Discoloration can be an important element in this business.

Element 14: Sample Parts

The actual sample parts should be delivered with or before the submission. Contact your Supplier Quality representative or Quality Manager at the site you are delivering parts to for clarification on who should receive the sample parts. The default quantity for all submissions is 3 parts unless requested otherwise. Sample parts must reflect the print revision the submission data and be sampled from an actual production run.

Instructions for Sample Parts Identification.

A minimum of 3 samples should be included with the PPAP submission. Contact your Quality Manager or Supplier Quality Representative to determine the proper department(s) to which to address the parts. Each sample part MUST be properly tagged and identified as a PPAP sample part with information listed below. The box that ships the parts should also be clearly labeled as containing *Unapproved PPAP Sample Parts* in order to avoid being misplaced or inadvertently mixed with approved production parts.

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Your sample parts must contain the following information listed below at a minimum or could possibly be rejected back for re-submission:

1. Identifying the part as a PPAP Sample Part
2. Date of Manufacture
3. WBT Part Number
4. Revision Level
5. Supplier Name
6. Name of Product
7. Product Serial and Batch Number (Required if applicable)
8. Approval markings (CE, UL, etc.) where applicable

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Element 15: Master Samples

A master sample (also known as a Golden Sample) is a final sample of the product that is inspected and signed off by the customer. The master sample part is used to train operators and serves as a benchmark for comparison to standard production parts if any part quality questions arise and should be identified accordingly. Master sample characteristics do not supersede print requirements. Any discrepancies must be resolved.

Element 16 Checking Aids

This is a detailed list of checking aids used by production. It should include all tools used to inspect, test or measure parts during the assembly process. The list should describe the tool and have the calibration schedule for the tool. Checking aids may include check fixtures, contour, variable and attribute gages, models or templates.

MSA may be required for all checking aids based on customer requirements.

Element 17 WBT Specific Requirements

Purpose: To address WBT specific requirements during PPAP submission.

- ✓ Tooling Information Form
- ✓ Packaging Form
- ✓ Specification Deviation Form
- ✓ Supplier Change Request
- ✓ Supplier PPAP Checklist

WBT reserves the right to request any of these at the time of PPAP submission or to request updates to these documents anytime during the life of the part.

The forms and instructions in this section are included in the PPAP Forms kit.

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Tooling Form

Purpose: Identifies all WBT owned tools at the time of production start-up.

This requirement is mandatory for all WBT owned tools and must be completed by the Product Line or supplier prior to PPAP approval.

Packaging Form

Purpose: Approve the packaging method and material for supplied product to ensure protection during transportation and introduction to the assembly line or customer.

Specification Deviation Form

Purpose: Documents variations in products or process from the initial specification and the actions of the supplier regarding those variations. There are three instances in which a Specification Deviation Form can besubmitted:

1. Existing Production Deviation: When a temporary deviation to a print or process (less 60 days) is requested from WBT. Approval must be received before the Product Line or supplier can proceed.
2. PPAP Submission: When requirements are viewed as not attainable or require a print change in order to approve the submission. Notify WBT Quality and Sourcing immediately upon discovery.
3. Request Print Changes: When seeking a change to a part specification for manufacturing issues or variances.

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Supplier Change Request (SCR) Instructions

Purpose: Documents a planned **permanent change** that affects the part or the process. Approval is required from WBT ***prior to initiating any activity***. Failure to have an approved SCR may affect customer quality and therefore future business opportunities.

WBT relies on the supplier to notify us in good faith of any planned change such as changing the manufacturing process or upgrade of tooling used to manufacture the part(s) supplied.

PPAP Checklist

Purpose: The checklist is used for referencing and organizing a PPAP submission. The checklist identifies the required elements for each LEVEL option 1 through 5.

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4.0 Approval

This document requires the approval of:

- Vice President of Quality

Revision History:

RELEASE AND REVISION HISTORY		
Date	**Originator**	**Description**
03/04/16	Tom Wooderson	Initial Release
10/27/16	John Jackson	Minor updates to support the Supplier Quality Manual
12/03/16	John Jackson	Major revision for simplification
01/21/2019	John Jackson	Added PPAP Steps (Qualified Lab Documentation, Master Samples, Checking Aids and added the PSW levels 4 & 5)
4/30/19	Chuck Rikli	Final revisions for clarity and distribution.

Approved:

(signature on file)

Vice President of Quality, (Chuck Rikli)