



KIMBALL  
ELECTRONICS  
GROUP

# COMPONENT APPROVAL PROCESS REQUIREMENTS MANUAL

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## 1. Scope

1.1 Each PPAP submission to KEG needs to be in line with the AIAG PPAP Manual and the Kimball Global Supplier Quality Manual (GSQM) with current revisions.

1.2 GSQM document is available at the following link:  
<http://www.kegroup.com/home/kegroup/GSQM/gsqm.pdf>

1.3 AIAG reference manuals are available at phone number 1-248-358-3003, or at the following link  
<http://www.aiag.org>

The list below identifies the manuals published by AIAG that the supplier should consult in the formatting of any PPAP submittal made to KEG facilities.

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

1.4. This document is based on Kimball's Customers' requirements and AIAG PPAP reference manual. Its goal is to highlight KEG PPAP submission requirements and expectations allowing for quick documentation review and sign off. It will show the link(s) between document(s)/section(s) and templates used.

1.5. Order of precedence:

This document and the documents listed above will apply in the following order of precedence with the noted degree of applicability:

- this document in its entirety
- Global Supplier Quality Manual (GSQM)
- AIAG manuals

## 2. Requirements and checklist

2.1. Each supplier shall maintain a PPAP Approved Status throughout the program life.

2.2. When a PPAP is required, the supplier shall not ship production intent material prior to PPAP approval, without written KEG authorization.

2.3. KEG requires a Level 3 PPAP submission for all initial submittals, unless otherwise specified.

2.4. KEG can request PPAP submittals for any component, independent of commodity, application requirements, or standard practices based on either KEG requirement or KEG's customer requirements.

2.5. KEG will officially notify the supplier when a PPAP is required. PPAP requirements will generally apply for custom (non off-the-shelf) components for use in medical, public safety, industrial, or automotive applications. Parts from each unique production process, duplicate assembly line and/or work cell, each position of a multiple cavity die, mold, tool or pattern, shall be measured / analyzed and results provided with the submission. Any components used to manufacture the part, will require identification and appropriate sub-supplier PPAP approval, see section 5.17.5.

If a supplier has been issued a Purchase Order that requires a PPAP, for a submission level other than Level 3, or for any activity other than an annual revalidation PPAP, a checklist shall be provided to identify the specific elements being requested.

2.6. If checklist is not provided, the supplier is to contact their Purchasing Contact and/or the Supplier Quality Contact for the KEG facility requesting the PPAP, and request the PPAP Checklist noting the specific requirements.

Questions regarding PPAP requirements are to be directed to the KEG Purchasing Contact and the Supplier Quality contact for the facility that is requesting the PPAP.

2.7. The supplier shall maintain all applicable PPAP elements/records for each part, or family of parts, regardless of the part submission level, and they shall be readily available, when requested.

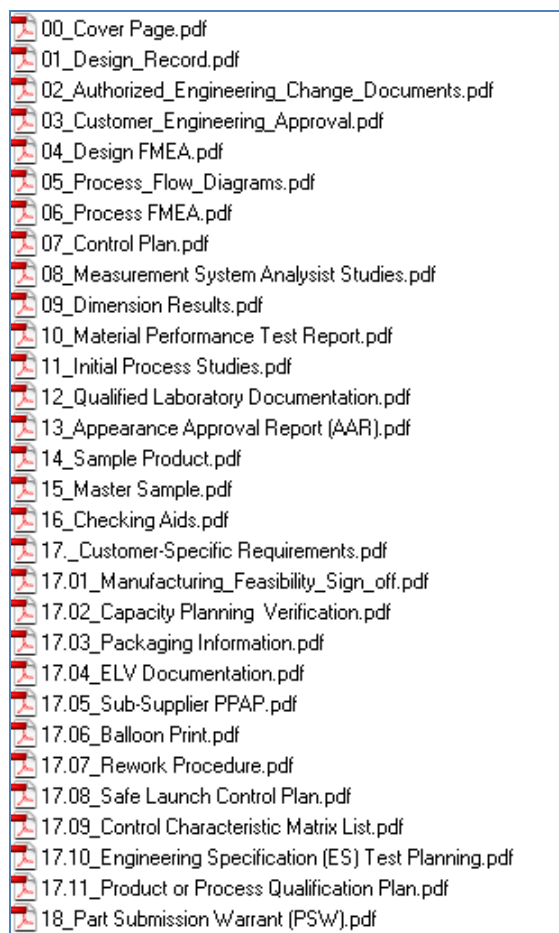
2.8. KEG Component Approval Checklist is a document provided by Kimball and given to the Supplier showing all requirements related with PPAP documentation submission: Part Number(s), EC number (Engineering Change), Submission reason, PPAP level, PPAP samples requirement and quantity, additional documents. A document example is available at :

[http://www.kegroup.com/home/kegroup/GSQM/Component\\_Approval\\_Checklist.doc](http://www.kegroup.com/home/kegroup/GSQM/Component_Approval_Checklist.doc)

### 3. Documentation and structure requirements

#### 3.1. Documentation structure and requirements

##### 3.1.1. General requirements



3.1.1.1. It is expected that PPAP documentation be received electronically, (example PDF files). Documentation can be prepared as one large file or in separate files as shown above; however, the structure (section names/numbers/content) needs to be in line. If the PPAP is submitted in separate files it is required to have all documents for certain

sections in one file – see point 3.3. Use of the Blank form for PPAP Submission package is an alternate method. A document example is available at

[http://www.kegroup.com/home/kegroup/GSQM/PPAP\\_Submission\\_Package\\_Blank\\_Form.doc](http://www.kegroup.com/home/kegroup/GSQM/PPAP_Submission_Package_Blank_Form.doc)

- 3.1.1.2. KEG's specific document requirements and retention/submission requirements will follow the guidelines established in the AIAG Production Part Approval Process (PPAP) Manual – see point 4.
- 3.1.1.3. All documents shall be dated within the last six (6) months, with all inspection results, test data, and material certifications dated within three (3) months of the submittal.
- 3.1.1.4. All documents shall clearly identify the part number and revision level. If the submittal represents specific cavities or tooling, the documentation shall reflect the cavity or tooling numbers used.
- 3.1.1.5. The initial shipment of material under an approved PPAP must be labeled in accordance with the requirements of GSQM Section 13.2 Special Labeling of Shipments.
- 3.1.1.6. Once initial shipment of product under an approved PPAP has been made, no material made prior to the PPAP can be shipped to KEG without written approval from the KEG site.

### 3.1.2. Annual Recertification Requirements

- 3.1.2.1. When notified by KEG, the supplier shall submit a Level 4 revalidation PPAP consisting of, at the minimum, a PSW and capability studies for all features defined as critical on the print.
  - 3.1.2.1.1. Additional requirements such as Complete Dimensional and/or Function/Electrical analysis of the component will be requested on an as needed basis.
  - 3.1.2.1.2. The annual revalidation submittal due date is considered to be the anniversary date that the initial PPAP was submitted, unless otherwise notified by KEG.
  - 3.1.2.1.3. Document requirements shall be consistent with those of an initial submittal.

### 3.1.3. Submission due to Approved SMCR

- 3.1.3.1. Submission may be required for any changes to a production process, design record, specification, or material. See GSQM section 3.0 Supplier Manufacturing Change Request and the AIAG/PPAP manual for clarification of general requirements.

### 3.1.4. Requirements for PPAP Approval

- 3.1.4.1. All required documentation for the submission level shall be included.
  - 3.1.4.1.1. Items indicated on the PPAP Checklist must be provided to achieve PPAP approval. Details on AIAG requirements are outlined in the AIAG/PPAP manual.
- 3.1.4.2. Any result(s) or finding(s) outside the specification limits is potential cause for rejection.
  - 3.1.4.2.1. Every possible action needed to correct the conditions is to be taken to ensure the part meets all design requirements prior to the initial PPAP submission.
  - 3.1.4.2.2. If the supplier is unable to meet any of these requirements, they must contact the KEG Purchasing and/or Supplier Quality Contact for all of the KEG facilities requiring PPAP, in writing, to determine the appropriate action(s) to be taken prior to submission.

- 3.1.4.3. Inspection and testing shall be performed by a qualified laboratory.
  - 3.1.4.3.1. If a commercial/independent test lab is utilized it must be an accredited facility.
    - 3.1.4.3.1.1. The supplier shall submit both the test results from the laboratory and the standards used to determine the validity of the testing activity.
    - 3.1.4.3.1.2. Blanket statements of conformance are unacceptable as test results.
  - 3.1.4.3.2. A copy of the laboratory’s certification must be included in the submission.
- 3.1.4.4. Once the submittal is approved, a KEG representative will return the signed copy of the warrant to the supplier for historical documentation.

3.1.5. Rejected PPAP Submittals

The supplier will be notified by a KEG representative of all discrepancies or deficiencies noted within the PPAP documentation.

A list of the discrepancies will be provided to the supplier.

Formal Corrective Action(s) may be required for any rejection due to incomplete or inaccurate documentation, and/or out of specification conditions or non-capable conditions.

3.2.Example of PPAP cover page

A document example is available at

[http://www.kegroup.com/home/kegroup/GSQM/PPAP\\_Checklist\\_Cover\\_Letter.doc](http://www.kegroup.com/home/kegroup/GSQM/PPAP_Checklist_Cover_Letter.doc)

3.3.Sections content description / index

Design Record Index	
Item	Page
1. Drawings	1 - 2
2. Electronic Data	3 - 9
3. Kimball Specification	10 - 15

or

17. Customer-Specific Requirements
17.1 Manufacturing Feasibility Sign-off
17.2 Capacity Planning & Verification
17.3 Packaging Information/Instructions /Sample Label
17.4 ELV Documentation
17.5 Sub-Supplier PPAP (Warrants)
17.6 Ballooned Print
17.7 Rework /Repairs Procedures
17.8 Safe Launch Control Plan
17.9 Control Characteristic Matrix/List
17.10 Engineering Specification (ES) Test Planning
17.11 Product or Process Qualification Plan

4. Retention/Submission Requirements:

4.1.The table below indicates PPAP retention/submission requirements:

Reference AIAG Production Parts Approval Process (PPAP) 4<sup>th</sup> Edition Table 4.1

Retention/Submission Requirements Table		Submission Level				
#	Requirements	1	2	3	4	5
1	Design Records (Drawings, Specifications)	R	S	S	*	R
-	for proprietary components/Details	R	R	R	*	R
-	for all other components/Details	R	S	S	*	R
2	Authorized Engineering Change Documents, if any	R	S	S	*	R
3	Customer Engineering Approval, if required	R	R	S	*	R
4	Design FMEA	R	R	S	*	R
5	Process Flow Diagram	R	R	S	*	R
6	Process FMEA	R	R	S	*	R
7	Control Plan	R	R	S	*	R
8	Measurement Systems Analysis Studies (Gage R&R)	R	R	S	*	R
9	Dimensional Results	R	S	S	*	R
10	Material & Performance Test Results	R	S	S	*	R
11	Initial Process Study	R	R	S	*	R
12	Qualified Laboratory Documentation	R	S	S	*	R
13	Appearance Approval Report (AAR), if applicable	S	S	S	*	R
14	Sample Product	R	S	S	*	R
15	Master Sample	R	R	R	*	R
16	Checking Aids	R	R	R	*	R
17	Records of Compliance with Customer-Specific Requirements					
17.1	Manufacturing Feasibility Sign-off	S	S	S	*	S
17.2	Capacity Planning & Verification	S	S	S	*	S
17.3	Packaging Information/Instructions w/Sample Label	R	R	S	*	R
17.4	ELV Documentation	S	S	S	*	S
17.5	Sub-Supplier PPAP (Warrants)	S	S	S	*	R
17.6	Balloon Print	R	R	S	*	R
17.7	Rework/Repairs Procedures	R	R	S	*	R
17.8	Safe Launch Control Plan	R	R	S	*	R
17.9	Control Characteristic Matrix/List	S	S	S	*	R
17.10	Engineering Specification (ES) Test Planning	R	R	S	*	R
17.11	Product or Process Qualification Plan	R	R	S	*	R
18	Part Submission Warrant (PSW)	S	S	S	S	R
	Bulk Materials Requirement Checklist (bulk matl PPAP only)	S	S	S	S	R

R - The supplier shall retain at appropriate location s, including manufacturing, and make **Readily** available to the customer representatives, when requested.

S - The supplier shall submit to designated customer product approval activity and retain a copy of records or documentation items at appropriate location, including manufacturing.

\* - The supplier shall retain at appropriate locations and submit to Kimball upon request.

## 5. PPAP content expectations

### 5.1. Design records

- 5.1.1. All released drawings and specifications (CAD/CAM data and other) needs to be included in this section and must be “ballooned” or “road mapped” to correspond with the inspection results. Notes on the print must also be included on the ballooned print and on the inspection data.  
For report of Part Material Composition – see point 4.17.4 ELV documentation.
- 5.1.2. This section shall have a link(s) to:  
- all PPAP sections by a drawing number and revision change number  
- sections 5, 6, 7, 8, 9, 11, 17.8, 17.9 – by special characteristics number/symbol (if characteristic is defined).
- 5.2. Authorized Engineering Change Documents
- 5.2.1. The authorized engineering change documents section is for all changes which are not yet implemented/recorded in design records but are incorporated in the product, part or tooling. If the submission does not meet all design records / print requirements, the documentation package must include a copy of the authorized engineering change documents.
- 5.2.1.1. Exception list form available on the second page of the Manufacturing Feasibility Statement.  
Document is available at:  
[http://www.kegroup.com/home/kegroup/GSQM/mfg\\_feasibility\\_form.doc](http://www.kegroup.com/home/kegroup/GSQM/mfg_feasibility_form.doc)
- 5.2.1.2. SMCR – Supplier Manufacture Change Request  
Document and instructions are available at:  
[http://www.kegroup.com/home/kegroup/GSQM/smcr\\_form.doc](http://www.kegroup.com/home/kegroup/GSQM/smcr_form.doc)  
[http://www.kegroup.com/home/kegroup/GSQM/SMCR\\_Instructions.pdf](http://www.kegroup.com/home/kegroup/GSQM/SMCR_Instructions.pdf)
- 5.2.1.3. SDR – Supplier Deviation Request  
Document and instructions are available at:  
[http://www.kegroup.com/home/kegroup/GSQM/deviation\\_request\\_form.doc](http://www.kegroup.com/home/kegroup/GSQM/deviation_request_form.doc)  
[http://www.kegroup.com/home/kegroup/GSQM/Supplier\\_Deviation\\_Request\\_Instructions.pdf](http://www.kegroup.com/home/kegroup/GSQM/Supplier_Deviation_Request_Instructions.pdf)
- 5.2.2. It is the Supplier’s responsibility to submit all required deviations. Each PPAP submission is treated as a new one and requires all deviations previously submitted, even if they were previously approved for the family of parts.
- 5.2.3. This section has a link(s) to:  
- section 1 – by part number and revision number  
- section 9 – by identified exceptions  
- section 17.1 – by data shown in the Manufacturing Feasibility Statement  
- section 18 – by statement shown on warrant form in submission results section
- 5.3. Customer Engineering Approval
- 5.3.1. This is a section which is included in AIAG PPAP 4th Edition manual, but which has little to no application for components delivered to KEG. Kimball’s Engineering Department will not typically provide an approval regarding PPAP prior to the submission itself. Therefore, this section will typically be left blank.

5.4. Design FMEA

5.4.1. The Design FMEA is required if the supplier is responsible for the design of the part (for example: black box design). Otherwise, the Design FMEA is the responsibility of Kimball. If the supplier feels that the DFMEA is proprietary they should insert a sheet in the PPAP package stating their position. The document needs to be developed in accordance with AIAG Potential Failure Mode and Effects Analysis reference manual.

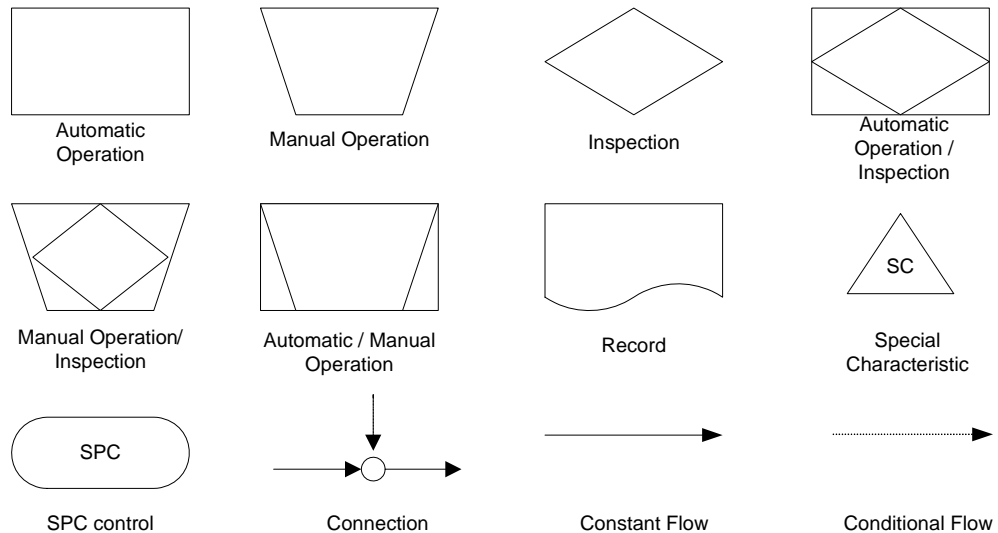
5.4.2. This section has a link(s) to:

- section 1 – by part number and revision number
- section 6 – connection to the PFMEA failure modes and severity levels

5.5. Process Flow Diagram

5.5.1. The Process Flow Diagram (PFD) is a document which clearly and in detail describes the production process steps. The Flow Diagram must follow the process from receipt of raw material and receiving inspection, through any ware housing and shipping steps. It should also include any "Dock Audits" and Final Inspections. The PFD shall comprehend all potential paths that a part can take in the process, including inspection, verification(s), containment, rework, scrap and sequence with reference to AIAG Advanced Product Quality Planning and Control Plan current revision. The purpose of this document is to define how material/product moves through production stations.

5.5.1.1. To describe clearly each operation station/step the symbols listed below can be used:



5.5.2. There must be a one to one match of the Operation numbers between the PFD, FMEA and Control Plans, to allow for easy cross-referencing of the documents. Special and Critical characteristics must be noted on PFD's.

5.5.3. This section has a link(s) to:

- section 1 – by part number and revision number
- sections 1, 6, 7, 8, 9, 11, 17.8, 17.9 – by special characteristics number/symbol (if characteristic is defined). A good practice is to use the characteristic symbol/description which is identified in the specification and add additional numbers from the PCM (Product Characteristic Matrix) to link both documents
- sections 6, 7, 17.8 – by process step name and number, operation/inspection type and record

5.6. Process FMEA

- 5.6.1. Kimball Supplier shall develop the Process FMEA in accordance with the AIAG Potential Failure Mode and Effects Analysis reference manual and Kimball GSQM.
- 5.6.2. It is expected that all historical and typical failure modes are addressed.
- 5.6.3. The Process FMEA must follow the process from the receipt of raw material through any ware housing and shipping steps. The PFMEA is a living document and should be initiated before or at the feasibility stage, prior to tooling for production, and take into account all manufacturing operations from individual components to assemblies.
  - 5.6.3.1. Ensure that the PFMEA meets Kimball’s requirements for Severity if not otherwise specified for critical characteristics:
    - level 1 is expected to have a severity ranking of no lower than 9
    - level 2 is expected to have a severity ranking of no lower than 7
    - level 3 is expected to have a severity ranking of no lower than 5
 each time Supplier can asses severity rank higher than described above. For detection and occurrence refer to AIAG FMEA manual.
  - 5.6.3.2. Supplier needs to implement an improvement/prevention action for each of the failure modes with an RPN (Risk Priority Number) of 100 and above. If all RPN’s are lower than 100, the supplier needs to work on failure modes with the highest RPN’s. During the initial document release and with each update the Supplier needs to update the change history and answer all questions from the check list. A document example is available at [http://www.kegroup.com/home/kegroup/GSQM/PFMEA\\_Template.xls](http://www.kegroup.com/home/kegroup/GSQM/PFMEA_Template.xls)
- 5.6.4. PFMEAs for “families” of parts are acceptable; however, it needs to be highlighted by a summary document which PFMEAs are “family” documents and which are Kimball part specific. See example below:

**PFMEAs for Kimball Part Number: XXX-XXXX-XX**

Process Description	Reference Document Number	Notes
Material Cut	PYY01	
Drilling	PYY05	Kimball Specific PFMEA
Plating	PYY06	Kimball Specific PFMEA
Outer Layer Image	PYY07	
Solder Mask	PYY09	
Fabrication	PYY11	Kimball Specific PFMEA
Electrical Test	PYY12	
Final Inspection	QYY02	
Immersion Tin	PYY16-04	
Outgoing Quality Control	QYY03	
Packing	QYY02-07	

- 5.6.5. Important: There must be a one to one match of the Operation numbers between PFD, FMEA and the Control Plan to allow for cross-referencing of the documents.

- 5.6.6. This section has a link(s) to:
- section 1 – part number and revision number
  - section 4 – connection to the DFMEA failure modes and severity levels
  - sections 1, 5, 7, 8, 9, 11, 17.8, 17.9 – special characteristics number/symbol (if characteristic is defined). A good practice is to use the characteristic symbol/description which is identified in specification and add additional number from the PCM (Product Characteristic Matrix) to link both documents.
  - sections 5, 7, 17.8 – process step name and number, operation/inspection type and record
  - section 17.9 – severity, occurrence, detection and RPN ranks
  - sections 7, 8, 9, 10, 11, 16, 17.9 – gauge name and number

## 5.7. Control Plan

- 5.7.1. Kimball Supplier shall have a Control Plan that defines all methods used for process control in accordance with AIAG Advanced Product Quality Planning and Control Plan reference manual and Kimball GSQM. It must follow the manufacturing process from receipt of raw material through shipping.
- 5.7.2. The Control Plan needs to include all inspection activities such as Receiving Inspection, Dock Audits, Final Inspections and all transportation inside and outside of the facility of finish and semi-finish component. Ensure that the Production Control Plan is clearly marked as such and is signed. The control plan must include the print rev number and letter and be comprehensive (i.e. it must include all part dimensional characteristics and notes provided on the blueprint, these characteristics must be listed on the control plan with the process characteristics that link to them in a cause and effect relationship). The Control Plan must be part, or part family, specific.
- 5.7.2.1. Sample size must be clearly identified as number of: pieces, panels verified and AQL level. If “All” units are verified the word “All” can be used.
- 5.7.2.2. Sample frequency must be clearly identified as: minutes/hours/days of production/setup/change over/production batch.  
General terms such as: : “Per Box”, “Each Lot”, Each Production Run”, “Each load”, “Every P/N”, “Every D/C”, etc, are not allowed.
- 5.7.2.3. Control Method must contain a description of how the operation will be controlled, including procedure numbers where applicable. A procedure number is not acceptable in the control method column unless a brief description of the procedure or a hard copy of the procedure is included. If work instructions are referred to in the control plan, they should be included in the PPAP package. Operations may be controlled by, but are not limited to, statistical process control (see AIAG Statistical Process Control manual), inspection, attribute data, mistake-proofing (automated/non-automated), and sampling plans. Control methods for both product and process characteristics should be listed.  
Control methods should be continually evaluated for effectiveness of process control. For example, significant changes in process or process capability should lead to an evaluation of the control method.
- 5.7.2.3.1. If otherwise not specified, control, frequency and reporting method for Special Characteristics needs to be performed in accordance with Kimball GSQM point 15: <http://www.kegroup.com/home/kegroup/GSQM/gsqm.pdf>
- 5.7.2.4. During the initial document release and with each update the Supplier needs to update the change history and answer all questions from the check list. A document example

is available at

[http://www.kegroup.com/home/kegroup/GSQM/Control\\_Plan\\_Template.xls](http://www.kegroup.com/home/kegroup/GSQM/Control_Plan_Template.xls)

- 5.7.3. Control plans for “families” of parts are acceptable; however, it needs to be highlighted by a summary document which Control Plans are “family” documents and which are Kimball part specific. See below example:

**CPs for Kimball Part Number: XXX-XXXX-XX**

Process Description	Reference Document Number	Notes
Material Cut	PYY01	
Drilling	PYY05	Kimball Specific CP
Plating	PYY06	Kimball Specific CP
Outer Layer Image	PYY07	
Solder Mask	PYY09	
Fabrication	PYY11	Kimball Specific CP
Electrical Test	PYY12	
Final Inspection	QYY02	
Immersion Tin	PYY16-04	
Outgoing Quality Control	QYY03	
Packing	QYY02-07	

- 5.7.4. All elements required to make a defect-free part need to be addressed in the control plan.
- 5.7.5. Important: There must be a one to one match of the Operation numbers between PFD, FMEA and the Control Plan to allow for cross-referencing of the documents.
- 5.7.6. This section has a link(s) to:
- section 1 – part number and revision number
  - sections 1, 5, 6, 8, 9, 11, 17.8, 17.9 – special characteristics number/symbol (if characteristic is defined). A good practice is to use the characteristic symbol/name which is identified in the specification and add additional number from PCM (Product Characteristic Matrix) to link both documents.
  - sections 5, 6, 17.8 – process step name and number, operation/inspection type and record
  - section 17.9 – control method/equipment used, frequency and sample size
  - sections 6, 8, 9, 10, 11, 16, 17.9 – gauge name and number
- 5.8. Measurement Systems Analysis Studies (Gauge R&R)
- 5.8.1. Kimball Supplier shall have applicable Measurement System Analysis studies, (e.g., gauge R&R, bias, linearity, and stability), for all gauges, measurement and test equipment in accordance with AIAG Measurement System Analysis reference manual and Kimball GSQM, even if the gauge is a hand tool, such as micrometers or callipers.
- 5.8.1.1. Confirm that the tolerance used in the calculation is no larger than what is reflected on the part print. Gauge R&R’s should be completed on all gauges used in the control plan and must be included for those features that will have capability studies submitted at the time of PPAP (example: significant and critical characteristics).
- 5.8.2. It is expected that the gauge studies are to be of the format: 3 operators, 3 trials, using 10 parts.

- 5.8.3. All gauge studies must be performed within six (6) months of submission date located on the PSW document. It is acceptable to have gauge studies within twelve (12) months, of submission date, if part was in serial production prior to PPAP submission and annual gauge evaluation process is present.
- 5.8.4. This section has a link(s) to:
- section 1 – by part number and revision number
  - sections 1, 5, 6, 7, 9, 11, 17.8, 17.9 – by special characteristics number/symbol (if characteristic is defined). A good practice is to use characteristic symbol/name which is identified in the specification and add additional number from PCM (Product Characteristic Matrix) to link both documents.
  - section 17.9 – by MSA/R&R results
  - sections 6, 7, 9, 10, 11, 16, 17.9 – by gauge name and number
- 5.9. Dimensional Results
- 5.9.1. Kimball Supplier shall have and provide evidence that dimensional verification required by the design record and the Control Plan have been completed and the results indicate compliance with specified requirements. Dimensional results shall be for each manufacturing process / area / line / machine / cavity / die.
- 5.9.2. Dimensional results should correspond to the “road mapped” or “Ballooned” Print / Design Record Details. Each data point must indicate “In Spec/Out of Spec” and/or “Pass/Fail”. For any requirements which do not meet the spec, there needs to be a corresponding item highlighted in PPAP section 2 “Authorized Engineering Change Documents” which is signed by a Kimball Engineering Authorized Person.
- 5.9.2.1. The quantity of parts to be checked is the default noted in the AIAG PPAP manual, unless otherwise noted by the Kimball SDE/SQE (Supplier Deveolpment Engineer / Supplier Quality Engineer).
- 5.9.3. Dimensional data must be within three (3) months of submission date located on PSW document. The supporting documents must be dated within six (6) months of submission date.
- 5.9.4. This section has a link(s) to:
- section 1 – by part number and revision number
  - sections 1, 5, 6, 7, 8, 11, 17.8, 17.9 – by special characteristics number/symbol (if characteristic is defined). A good practice is to use the characteristic symbol/name which is identified in the specification and add additional number from PCM (Product Characteristic Matrix) to link both documents.
  - section 2 – by identified exceptions
  - sections 6, 7, 8, 10, 11, 16, 17.9 – by gauge name and number
  - section 18 – by statement shown on warrant form in submission results section
- 5.10. Material & Performance Test Results
- 5.10.1. Kimball Supplier shall have and provide records of material certifications / material test results, showing performance or durability tests relating to the part and the base materials, specified on the design record including drawings, functional, validation specifications and the Control Plan. These test reports can be from the supplier’s internal lab or outside contracted lab.

- 5.10.2. All tests performed shall be at an accredited facility, with proof of accreditation and scope (ISO/TS 16949 for internal laboratories and ISO/IEC 17025 for external laboratories).
- 5.10.3. Usually this section is divided into two Material Test Results / Certifications and Performance / Durability Test Results.
- Material Test Results / Certifications - include any material certifications / material test results relating to the part and the base materials from the supplier's internal lab or outside contracted lab. If there are material specifications noted on the print, Supplier must provide data that shows conformance to those specifications in the PPAP package.
  - Performance / Durability Test Results - include any performance or durability tests as prescribed in the design record, including drawings functional testing, and validation specifications.
- 5.10.4. All studies must be performed within six (6) months of the submission date located on the PSW document.
- 5.10.5. This section has a link(s) to:
- section 1 – by part number and revision number
  - sections 6, 7, 8, 9, 11, 16, 17.9 – by gauge name and number
- 5.11. Initial Process Study
- 5.11.1. Supplier shall demonstrate process capability studies for all Special and Critical Characteristics identified in the documentation.
- 5.11.1.1. If otherwise not specified Cpk/ Ppk requirements, samples size requirements, and types of studies are defined in the Kimball GSQM section 15: Designation and Control of Special Characteristics.
- 5.11.2. All studies must be performed within six (6) months of the submission date located on the PSW document.
- Supplier shall perform measurement system analysis to understand how measurement error affects the study measurements (see 5.8.).
- 5.11.3. This section has a link(s) to:
- section 1 – by part number and revision number
  - sections 1, 5, 6, 7, 8, 9, 17.8, 17.9 – by special characteristics number/symbol (if characteristic is defined). A good practice is to use the characteristic symbol/name which is identified in the specification and add additional numbers from the PCM (Product Characteristic Matrix) to link both documents.
  - section 17.9 – by Cp, Cpk, Pp, Ppk value
  - sections 6, 7, 8, 9, 10, 16, 17.9 – by gauge name and number
- 5.12. Qualified Laboratory Documentation
- 5.12.1. If testing is performed in a supplier's internal lab, the supplier must provide a copy of their ISO/TS 16949 quality certification.
- 5.12.1.1. The supplier is also to provide documentation of the appropriate laboratory scope.
- 5.12.2. If an external lab is used, the supplier must provide a copy of the outside lab certification and the scope of the accreditation (must be ISO 17025 certified or equivalent).
- 5.12.2.1. The supplier shall submit the test results on the laboratory letterhead or the normal laboratory report format.

- 5.12.2.2. As a best practice, the supplier should indicate specifically which labs were used for the applicable part number and the date (s) of the tests (i.e. by test leg or other indication of laboratory usage).
- 5.12.2.3. Laboratories which were not used expressly, or those used indirectly in the testing of the applicable part number, should not be referenced.
- 5.12.3. All gauges and test equipment used must be calibrated using Test Masters which are calibrated by an accredited calibration laboratory (which must be ISO 17025 certified or equivalent).
- 5.12.4. If the print requires unique testing to confirm the quality level of the part:
  - a. the evidence for the calibration of the test equipment must be included.
  - b. the listing of the Qualified Laboratory Documents, as required in 5.12.1 and 5.12.2 points above is to be included.
- 5.12.5. This section has a link(s) to:
  - section 1 – by part number and revision number
- 5.13. Appearance Approval Report (AAR), if applicable
  - 5.13.1. Any part that is color matched, needs graining, or other appearance approval must have an appearance approval report attached to the PPAP.
  - 5.13.2. This section has a link(s) to:
    - section 1 – by part number and revision number
- 5.14. Sample Product (Submitted to Kimball)
  - 5.14.1. The required amount of samples are defined in the KEG Component Approval Checklist (see 2.).
    - 5.14.1.1. Parts/samples need to be marked/numbered and reflect data shown in PPAP section 9 (see 5.9.).
  - 5.14.2. This section has a link(s) to:
    - section 1 – by part number and revision number
- 5.15. Master Sample
  - 5.15.1. Per AIAG PPAP Manual 4th edition: “The organization shall retain a master sample for the same period as the production part approval records, or a) until a new master sample is produced for the same customer part number for customer approval, or b) where a master sample is required by the design record, Control Plan or inspection criteria, as a reference or standard. The master sample shall be identified as such, and shall show the customer approval date on the sample. The organization shall retain a master sample for each position of a multiple cavity die, mold, tool or pattern, or production process unless otherwise specified by the customer.”
  - 5.15.2. This section has a link(s) to:
    - section 1 – by part number and revision number
- 5.16. Checking Aids

- 5.16.1. When there are special tools for checking parts (any part-specific assembly or component checking aid), the supplier shall submit information on it with their PPAP submission.
- 5.16.1.1. This section shows a picture of the tool/gauge and calibration records, including a dimensional report of the tool/gauge. Gauge / Tool / Checking Aids number(s) needs to be in line with Control Plan and PFMEA.
- 5.16.2. This section has a link(s) to:
- section 1 – by part number and revision number
  - sections 6, 7, 8, 9, 10, 11, 17.9 – by gauge name and number
- 5.17. Records of Compliance with Customer-Specific Requirements
- 5.17.1. Manufacturing Feasibility Sign-off
- 5.17.1.1. The Manufacturing Feasibility Statement is a commitment by a supplier that the customized component's proposed design can be manufactured at a quality level of zero defects, while meeting all capability requirements, and shipped at a rate consistent with the production requirements.
- 5.17.1.2. Feasibility reviews shall be documented using the Manufacturing Feasibility Statement form available on the KEG website at  
[http://www.kegroup.com/home/kegroup/GSQM/mfg\\_feasibility\\_form.doc](http://www.kegroup.com/home/kegroup/GSQM/mfg_feasibility_form.doc)
- 5.17.1.3. This section has a link(s) to:
- section 1 - by part number and revision number
  - sections 2, 9, 18 – by data/exceptions mentioned
  - section 18 – by statement shown on warrant form in the submission results section
  - GSQM section 17
- 5.17.2. Capacity Planning & Verification
- 5.17.2.1. The primary purpose of capacity verification is to determine/identify bottlenecks within the manufacturing process of customized components that could impact the supplier's ability to meet KEG's requirements.
- 5.17.2.1.1. Refer to KEG website for a copy of the Capacity Verification form  
[http://www.kegroup.com/home/kegroup/GSQM/Capacity\\_Verification\\_Form.xls](http://www.kegroup.com/home/kegroup/GSQM/Capacity_Verification_Form.xls) and Capacity Verification Instruction at  
[http://www.kegroup.com/home/kegroup/GSQM/Capacity\\_Verification\\_Form\\_Instruction.pdf](http://www.kegroup.com/home/kegroup/GSQM/Capacity_Verification_Form_Instruction.pdf).
- 5.17.2.2. This section has a link(s) to:
- section 18 – by production rate given
  - GSQM section 16
- 5.17.3. Packaging Information/Instructions / Sample Label
- 5.17.3.1. Each Supplier shall communicate packaging method and identify labelling methodology following the requirements listed below. Properly defined information will allow for timely shipment acceptance and proper data storage in the traceability system, thus avoiding RI rejects.

- 5.17.3.1.1. Please see GSQM section 13 for labelling requirements, KEG's Labeling Standard is located on the KEG website at [http://www.kegroup.com/home/kegroup/Supplier\\_Info/KEG\\_Shipment\\_Labeling\\_Standards.pdf](http://www.kegroup.com/home/kegroup/Supplier_Info/KEG_Shipment_Labeling_Standards.pdf)
- 5.17.3.2. The SPI (Supplier Packaging Information) form is used to communicate any key information and special requirements that KEG is communicating.
  - 5.17.3.2.1. This packaging definition may include, but is not limited to, container size, number of pieces per container, suggested orientation of the parts in the container, and other special packaging requirements.
  - 5.17.3.2.2. The packaging definition and special requirements are provided to ensure that we promote common packaging systems, achieve lean manufacturing objectives, and communicate the concerns and information needed by suppliers to ship a quality part.
  - 5.17.3.2.3. SPI template is available at: [http://www.kegroup.com/home/kegroup/GSQM/SPI\\_Supplier\\_Packaging\\_Information.xls](http://www.kegroup.com/home/kegroup/GSQM/SPI_Supplier_Packaging_Information.xls)
- 5.17.4. ELV Documentation
  - 5.17.4.1. Please refer to GSQM section 19.
- 5.17.5. Sub-Supplier PPAP (Warrants)
  - 5.17.5.1. The supplier is responsible for all sub-suppliers and outsourced processes. To demonstrate this control the supplier is required to submit the PPAP warrants to KEG. Using the KEG\_Supplier\_Component\_Matrix form available at: [http://www.kegroup.com/home/kegroup/GSQM/Supplier\\_Component\\_Matrix.xls](http://www.kegroup.com/home/kegroup/GSQM/Supplier_Component_Matrix.xls)
- 5.17.6. Balloon Print
  - 5.17.6.1. This is a print which contains all features “ballooned” or “road mapped” to correspond with the inspection results. Notes and other requirements must be also included on the ballooned print, and on the inspection data. It is required that the supplier use existing numbers from the drawing and notes when such are present.
  - 5.17.6.2. The purpose of this print is to have a unique identifier for each element on the print; that can be compared to other required documentation such as the dimensional layout report.
  - 5.17.6.3. The Ballooned Print must be of the most recent revision officially released by the KEG Purchasing Department from the facility requesting the PPAP.
- 5.17.7. Rework/Repairs Procedures
  - 5.17.7.1. If rework, repair, salvage or reclaim operations become a necessary part of the production operation, they must be PPAP approved and are to be submitted as part of the PPAP submission.
    - 5.17.7.1.1. All processes must be supported by documented procedures that ensure compliance to all related specifications, and will need to be uniquely identified within the Process Flow Diagram, Process FMEA, Control Plan, and any appropriate supporting documentation.
    - 5.17.7.1.2. Once the initial PPAP has been approved, the addition of any rework, repair, salvage or reclaim operations can only be done via the SMCR process (see GSQM Section 3.0.) or SDR process (see GSQM Section 18.0).

- 5.17.7.2. It is required that the Supplier submit a document to define all rework, repair, salvage or reclaim activities which are implemented throughout the manufacturing process.

#### 5.17.8. Safe Launch Control Plan

- 5.17.8.1. The Safe-Launch Control Plan must document increased sample sizes and/or sample frequencies for quality checks performed during the safe-launch period. Each Process Operation in the Safe-Launch Control Plan must have a higher sample size and/or sample frequency than what is noted in the Production Control Plan.
- 5.17.8.1.1. If otherwise not specified, the period is defined in the GSQM document in section 21.0 Safe Launch Requirements.
- 5.17.8.1.2. The Safe-Launch Control Plan must follow the process from receipt of raw material through shipping.
- 5.17.8.1.3. Important: There must be a one to one match of the Operation numbers between the PFD, FMEA and Control Plan to allow for cross-referencing of the documents.
- 5.17.8.1.4. The exit criteria must be defined in the PCM document. The supplier can only exit safe launch controls after Kimball SQE/SDE acceptance.
- 5.17.8.2. This section has a link(s) to:
- section 1 – by part number and revision number
  - sections 1, 5, 6, 7, 8, 9, 11, 17.9 – by special characteristics number/symbol (if characteristic is defined). A good practice is to use characteristic symbol/name, which is identified in the specification and add additional number from the PCM (Product Characteristic Matrix) to link both documents.
  - sections 5, 6, 7 – by process step name and number, operation/inspection type and record
  - section 17.9 – by control method/equipment used, frequency and sample size

#### 5.17.9. Control Characteristic Matrix/List

- 5.17.9.1. This is a document which defines in detail the supplier process controls for critical and significant characteristics. It will also define safe launch and process controls required, including exit criteria. PCM (Product Characteristic Matrix) template is available at:  
[http://www.kegroup.com/home/kegroup/GSQM/PCM\\_Product\\_Characteristic\\_Matrix.xls](http://www.kegroup.com/home/kegroup/GSQM/PCM_Product_Characteristic_Matrix.xls)
- 5.17.9.2. This section has a link(s) to:
- section 1 – by part number and revision number
  - sections 1, 5, 6, 7, 8, 9, 11, 17.8 – by special characteristics number/symbol (if characteristic is defined)
  - sections 5, 6, 7 – by process step name and number, operation/inspection type and record
  - section 6 – by severity, occurrence, detection and RPN ranks
  - section 7 – by control method/equipment used, freq and sample size
  - section 11 – by Cp, Cpk, Pp, Ppk values
  - section 17.8 – by control method/equipment used, freq and sample size

- section 4.8 – by MSA/R&R results
- sections 6, 7, 8, 9, 10, 11, 16 – by gauge name and number

#### 5.17.10. Engineering Specification (ES) Test Planning

5.17.10.1. Where engineering specifications require product validation testing, the supplier will be required to include a documented test plan.

5.17.10.1.1. This validation plan shall include details for each characteristic being evaluated, test facility, start date(s) and target completion dates.

5.17.10.1.2. Refer to AIAG/APQP manual section on DVP&R (Design Verification Plan and Report).

#### 5.17.11. Product or Process Qualification Plan

5.17.11.1. During the planning and development of a new product, it is expected that the supplier develop a documented Product/Process Qualification Plan to qualify new or changed processes.

5.17.11.1.1. This is to include planned steps to reach production intent processes and rates.

5.17.11.1.2. This can be documented via the project time line or a formal DVP&R. See the AIAG/APQP manual section on DVP&R (Design Verification Plan and Report).

#### 5.18. Part Submission Warrant (PSW)

5.18.1. A Part Submission Warrant of the latest revision level must be properly filled out (refer to the latest AIAG PPAP manual).

5.18.1.1. The P/N Revision Letter and Number must be noted on the warrant.

5.18.1.2. The Warrant must have a declaration of sample production rate and explanation of deviations.

5.18.1.3. The part weight must be reported to 4 decimals, in Kilograms.

5.18.2. KEG Part Submission Warrant is located on the KEG website at:

[http://www.kegroup.com/home/kegroup/GSQM/warrant\\_form.doc](http://www.kegroup.com/home/kegroup/GSQM/warrant_form.doc).

5.18.3. This section has a link(s) to:

- section 1 – by part number and revision number
- sections 2, 9, 17.1 – by statement in submission results
- section 17.2 – by production rate given

## 6. Supplier Self Assessment

6.1. To guarantee a high level of approved documents, each submitted PPAP is verified by Kimball Electronics Group using a special tool called the PPAP Review Checklist. It is highly recommended that the supplier use this tool as a self assessment prior to PPAP submission to Kimball.

6.2. PPAP Review Checklist is available at:

[http://www.kegroup.com/home/kegroup/GSQM/PPAP\\_Review\\_Checklist.xls](http://www.kegroup.com/home/kegroup/GSQM/PPAP_Review_Checklist.xls)