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REVISIONS

REV	DESCRIPTION OF CHANGE	BY	DATE	ECN NO
1	Release for Production	Mike Rawson	2/17/05	84019A
2	Revise APQP Tracking Checklist Appendix A	Mike Rawson	5/05/05	84331A
3	Revise APQP Tracking Checklist Appendix A	Mike Rawson	1/10/06	84924A
4	Added supplier Risk Assessment Form & Risk Factor Table; Update KSS logo	Mike Rawson	8/06/07	28797
5	Updated KSS logo and template Add Roles & Responsibilities Revised APQP Tracking Sheet Requirements Clarification of individual APQP requirements Revise Related Documents Revise Appendix Documents	N. Crossett	10/20/08	32773



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1.0 PURPOSE

This document describes how Key Safety Systems, Inc., manages the Advanced Product Quality Planning (APQP) process with Co-design or Manufacturing suppliers, from the Early Supplier involvement meeting to the Final PPAP approval. The objective of these activities is to ensure successful and timely Submission in accordance with Program timing requirements.

2.0 SCOPE

The Supplier Advanced Product Quality Planning guidelines apply to all new products and/or significant modifications of existing products that Key Safety Systems, Inc procures from outside sources.

3.0 DEFINITIONS

AIAG	Automotive Industry Action Group
APQP	Advanced Product Quality Planning
PPAP	Production Part Approval Process
SDE	Supplier Development Engineer
SQE	Supplier Quality Engineer
ESI	Early Supplier Involvement
SOP	Start of Production
AIR	Action Item Register

4.0 ROLES AND RESPONSIBILITIES


The following are the roles and responsibilities for the Supplier APQP process.

Supplier

- Attend ESI Meeting
- Establish Target timing for all APQP Activities on the KSS Supplier APQP Tracking sheet
- Provide bi-weekly status updates to SDE on the KSS Supplier APQP Tracking sheet and Tool Progress Report
- Communicate any issues to SDE
- Maintain Evidence Book containing documentation of all APQP Activities

SDE

- Attend ESI

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- Launch APQP process with supplier
- Maintain Global APQP Tracking Sheet
- Bi-weekly follow-up with supplier to ensure APQP tracking sheet updates.
- Review APQP update submissions from Suppliers.
- Review Tool Progress Report in conjunction with Tool Engineering
- Review Core documents and give feedback to supplier (Process Flow, PFMEA, Control Plan)
- Run at Rate / Core document audit at SDE Discussion
- Corrective Action coordination with supplier during development process
- Ensure Launch Containment System Implementation
- **Manage Supplier APQP Timing to ensure On Time PPAP Submission per program requirements**

Commodity Manager

- Schedule ESI Meeting
- Supply SDE with confirmation of Supplier Kick off
- Distribute Released Drawings to Supplier

Program Management

- Notify SDE group of any Supplier Issues that may jeopardize program launch
- Provide Ramp Up Plan to supplier
- Provides Program Milestones and Supplier PPAP Deadlines
- Advise SDE of any status changes relating to the program that affect components under APQP


Engineering

- Inform SDE group of Supplier Quality Concerns and Issues
- Communicate to SDE upcoming engineering changes
- Timely Release of Component drawings

Plant SQE

- Provide Updated PPAP Approval Status to SDE
- Notify SDE group of Issues that may result in delay of PPAP Approval.

5.0 DETAILED INSTRUCTIONS

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5.1 Initiation of APQP Process

The APQP Process is initiated in the ESI meeting, which is to be conducted per KSS Procedure 1004816. In this meeting, program timing is discussed, and the supplier PPAP Date is determined. At this time, the SDE will review the APQP Procedure with the supplier and provide the APQP Tracking sheet.

5.2 APQP Tracking Sheet

The Supplier is responsible for providing the Initial APQP Tracking Sheet submission to the SDE. Initial Timing submission on the APQP Tracking sheet is due by the date agreed upon by SDE and Supplier Representatives in ESI meeting. In the case where no specific timing is agreed, APQP Tracking Sheet Submission is due within 5 days of ESI completion.

The supplier is responsible for providing target completion dates for all steps listed on the APQP Tracking sheet in the row labeled “Supplier Target Date”. These dates should be determined individually per task, such that the overall completion timing meets the Supplier PPAP Date agreed upon in ESI.

The Target Dates, once provided on the initial submission, are not to change without the agreement of the SDE.

Successful Supplier PPAP Submission MUST occur by the timing established.

Steps on the APQP Tracking Sheet are defined as follows:

1. ESI Items


ESI meetings will be conducted. In this meeting, Supplier should receive either officially released or preliminary component drawing including GD&T, 3D CAD Model for component, applicable specifications, and the APQP Tracking sheet. Each of these items are required in order to complete this item. For example, if the supplier has received the specifications, and the APQP tracking sheet, but the drawing is not received, the item should be shown as incomplete.

2. Kick off Date:

Date on which the supplier receives Tooling PO or Blanket order as applicable.

3. Ramp Up Plan Received:

Supplier is to determine, based on known lead times for raw materials, production, and shipping, when a ramp up plan from KSS must be received in order to ensure that they can support production releases immediately following PPAP Submission and approval.

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4. Design Responsible Requirements:

- DFMEA must be complete and meet requirements per AIAG.
- Design Review must be completed such that DFMEA is verified and approved by cross-functional team.
- DV Plan must be approved and complete with verification of conformance to requirements as defined on engineering drawing.

In cases where Supplier is not design responsible, timing for these items shall be shown as “N/A”. Color Status shall be shown as Green.

5. Component Production and verification plan

- Tooling and gage design complete for production and measurement of component
- MSA verification per AIAG requirements.

6. Process Flow chart

Process Flow Chart must be completed per AIAG Requirement.

7. PFMEA

PFMEA must be established and cross-functionally reviewed to meet AIAG requirements.

8. Prototype Control Plan:

Prototype Control Plan must be established with direct correlation to Process Flow chart and PFMEA, per AIAG requirements. Control plans must include all Drawing items as indicated on Appendix I of KSS Quality First Manual, with verification at the appropriate Frequency.

9. Prototype Build:


Prototype Build timing defined in order to meet either KSS-dictated or Supplier Product development Plan requirements, as applicable.

10. Pre-Launch Control Plan:

To be established and cross-functionally reviewed to meet AIAG requirements, as applicable. Control plans must include all Drawing items as indicated on Appendix I of KSS Quality First Manual, with verification at the appropriate Frequency.

11. Production Control Plan

To be established with direct correlation to Process Flow chart and PFMEA per AIAG requirements. Control plans must include all Drawing items as indicated on Appendix I of KSS Quality First Manual, with verification at the appropriate Frequency.

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12. Operator Process Instructions:

Operator Process Instructions must be established in conjunction with Control plan documents, showing step by step instructions for each operation.

13. Production Tool Completion.

Production Tool Completion in order to begin trial production and yield first-off parts.

14. First off parts:

First off parts produced with Production tool and Process, to be provided to KSS for review, with Dimensional Layout and Material Certification information.

15. Packaging Specifications

Packaging Specifications must be determined and agreed upon with Materials and Logistics organization at the KSS Plant.

16. Sub-contractor 100% PPAP Approval

100% PPAP Approval from Sub-sources is required in order to begin Production Trials, PV Testing and PPAP Production run, as applicable.

17. Production Trial Run

Production Trial Run on the Production process is required to verify parts are correct and process is capable.

18. Preliminary Process Capability Studies

Preliminary Process Capability Studies must be completed on all component features to ensure Production Process is stable and capable as required per Appendix I of KSS Quality First Manual.

19. Parts Verified Dimensionally Correct

Verification of 100% dimensionally correct components off Production Process is required in order to proceed with PV testing and Run at Rate / PPAP Production run.


20. Production Validation Testing

PV Testing must be completed to verify compliance to drawing specifications as required.

21. Color / Grain Approval

Color and Grain Approval must be acquired, as applicable.

22. Run At Rate

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Run At Rate should be completed per KSS Run at Rate procedure 1005108, in conjunction with the PPAP Production Run.

23. KSS Launch Containment Requirements

KSS Launch Containment Requirements are described in procedure 1005106. Launch Containment verification shall be conducted on all new parts per the procedure.

24. Core Document Audit / Line Walk.

Core Document Audit and Line walk may be conducted onsite by SDE, or may be conducted by supplier and reported, as communicated to the supplier by the SDE.

25. Supplier PPAP Submission Date.

Supplier PPAP Submission date is the date submission must be received at the respective KSS Plant location. This timing is determined in ESI and must be met.

The Supplier shall maintain current status for all items on the APQP Tracking sheet. The Supplier shall add Actual Completion Dates for each item as they are completed and maintain the Program Status for each activity.

The “Program Status” box below each date is to be colored according to status of completion according to the following criteria:

- Green: Activity is on schedule for completion by Target Date, or has been completed by Target Date
- Yellow: Activity is at risk. Actions required to maintain timing.
- Red: Activity is behind schedule and will not be completed by Target Date, or was completed after the target date.


The supplier is required to provide bi-weekly updates on the APQP Tracking Sheet to the SDE on the day agreed upon by the Supplier and the SDE. Updates are to be provided until Full PPAP Approval is achieved for the part.

5.3 Combined Program Supplier APQP Tracking Sheet

The SDE is responsible for consolidating all supplier APQP Tracking Sheet submissions onto the Global Combined APQP Tracking sheet. This file is to be maintained on the KSS Network Drive for Global Access.

5.4 APQP Review

The SDE is responsible for managing all Supplier APQP activities from APQP initiation at ESI until the PPAP submission.

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The SDE shall review status updates from the suppliers to ensure all activities are progressing on time per the supplier target timing established. The SDE shall involve Cross-Functional team members from KSS and the supplier as required to address any issues that are identified and manage the resolution of the issue.

The SDE shall call meetings with supplier and applicable cross-functional team members to review the APQP Status and Open Issues. Meetings shall be held as necessary at the discretion of the SDE based in the current status of the APQP activities and potential impact on the program.

The SDE shall confirm that Supplier timing is in accordance with the Drop Dead PPAP Timing Established by the Program Manager for each applicable program and notify the cross-functional program team of any Supplier APQP issues that may jeopardize the program timing.

5.5 Supplier Risk Assessment

The purpose of risk assessment is to provide a cross-functional review of the program supply base to identify those suppliers and/or part numbers who require special development and oversight to ensure launch success.

Risk Assessment will occur for each new component. Risk status will be considered by SDE in management of APQP activities with each supplier and component. Risk Status will be indicated on the APQP Tracking sheet.

5.6 Core Document Review


The supplier shall provide the following documents to the SDE upon request for review prior to PPAP Submission:

- Process Flow Diagram
- PFMEA
- Control Plans

The SDE is responsible for review of Core Quality Documents of High Impact Suppliers and/or components. Feedback on these documents should be provided to the supplier such that improvements can be made, if necessary, prior to the initial PPAP Submission. Review of Core Quality Documents for Non-High Impact suppliers may be completed at the discretion of the SDE.

5.7 Review of First Off Tool Parts and Dimensional Results

The Supplier shall provide First off tool sample parts with dimensional layout results to the SDE for review. The SDE is responsible for providing these samples and dimensional results to Applications Engineering for functional evaluation and facilitating the communication of any issues to the supplier. The SDE is responsible for following up on any Corrective Actions required by the supplier to address dimensional non-conformances.

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5.8 Run at Rate

Run at Rate is to occur immediately prior to SOP of the Supplier, in conjunction with the PPAP Production Run, in accordance with KSS Run at Rate procedure 1005108. The Run at Rate will either be witnessed by SDE on site for High Impact suppliers, or be conducted by the supplier and reported to SDE at the discretion of the SDE.

The objective of Run at Rate is to verify the complete capacity and capability of the process. Production rate is to be reported on the PSW submitted with the PPAP. If the Run at Rate passes the process is fully validated for mass production. If the Run at Rate fails, the supplier must take appropriate corrective action and repeat the Run at Rate until it passes. The SDE is to follow-up until this is completed.

5.9 Supplier Ramp Up Plan Self Assessment

Supplier shall provide completed Supplier Ramp Up Plan Self Assessment at the time of Run at Rate. SDE shall review to ensure all items are complete, and inform the Program Manager and Plant Launch Coordinator of issues as required.

5.10 Core Document Audit & Line Walk On-site

For Suppliers deemed High Impact, the SDE shall schedule a visit to the supplier production facility to review the APQP Evidence Book, walk the production lines and audit for compliance to the Core Quality Documents. This visit shall occur in conjunction with the Run at Rate per section 5.8. Visits to Non-High Impact suppliers may occur as needed at the discretion of the SDE.

5.11 Launch Containment Requirements


The Supplier is responsible for conformance to the KSS Launch Containment System Requirements. The SDE will communicate KSS Launch Containment Requirements to the supplier in accordance with the KSS LCS Procedure 1005106, and ensure LSC Implementation at the supplier.

5.12 PPAP Submission and Disposition

The supplier shall provide the PPAP Submission, in accordance with AIAG PPAP Revision 4 and KSS-specific requirements, to the SQA at the receiving KSS Plant location. It is expected that all specification requirements shall be met in the PPAP Submission. The SQA shall review and disposition the PPAP Package.

5.13 PPAP Approval Status Reporting

PPAP Approval Status shall be communicated by the SQA to the Supplier, the SDE, and program team on a part by part basis. SDE/SQA communication shall occur via the method agreed by the individual plant SQA and SDE.

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5.14 PPAP Issue Resolution

Upon disposition of the PPAP Package, the SQA is responsible for the communication of PPAP issues. The SQA shall request corrective action from the supplier and manage resolution of the open issues. SDE will support the SQA to get timely responses from the supplier and aide in resolution of PPAP issues that can not be immediately resolved.

5.15 APQP Closure

Supplier APQP Activities reach closure when Full PPAP Approval is issued for each individual component. Once closed, part shall be removed from the Open Global Supplier APQP Tracking sheet, and placed on the Closed APQP Sheet.

6.0 RELATED DOCUMENTS

- KSS Quality First Manual, Document 82000030
- KSS APQP Tracking Sheet, Document 1019350
- KSS Run at Rate Procedure, Document 1005108
- KSS ESI Procedure, Document 1004816
- KSS LCS Procedure, Document 1005106

7.0 APPENDIX DOCUMENTS (for Supplier Reference only)

Appendix A: Product Quality Summary

Appendix B: Design FMEA Checklist

Appendix C: Design Information Checklist

Appendix D: New Equipment, Tooling Checklist


Appendix E: Product / Process Quality Checklist

Appendix F: Floor Plan Checklist

Appendix G: Process Flow Chart Checklist

Appendix H: PFMEA Checklist

Appendix I: Control Plan Checklist

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APPENDIX A

Product Quality Summary



Product name: _____
Customer: _____

Date: _____
Part Number: _____
Manufacturing Plant: _____

1. PRELIMINARY PROCESS CAPABILITY STUDY

Ppk- SPECIAL CHARACTERISTICS

QUANTITY		
REQUIRED	ACCEPTABLE	PENDING*

2. CONTROL PLAN APPROVAL (If Required)

APPROVED: YES NO* DATE APPROVED: _____

3. INITIAL PRODUCTION SAMPLES CHARACTERISTICS CATEGORY

DIMENSIONAL
VISUAL
LABORATORY
PERFORMANCE

SAMPLES	CHARACTERISTIC PER SAMPLE	QUANTITY	
		ACCEPTABLE	PENDING*

4. GAGE AND TEST EQUIPMENT MEASUREMENT SYSTEM ANALYSIS

SPECIAL CHARACTERISTICS

REQUIRED	ACCEPTABLE	PENDING*

5. PROCESS MONITORING

PROCESS MONITORING INSTRUCTIONS
PROCESS SHEETS
VISUAL AIDS

QUANTITY		
REQUIRED	ACCEPTABLE	PENDING*

6. PACKAGING/SHIPPING

PACKAGING APPROVAL
SHIPPING TRIALS

QUANTITY		
REQUIRED	ACCEPTABLE	PENDING*

7. SIGN-OFF

TEAM MEMBER/TITLE/DATE

TEAM MEMBER/TITLE/DATE


TEAM MEMBER/TITLE/DATE

TEAM MEMBER/TITLE/DATE

TEAM MEMBER/TITLE/DATE

TEAM MEMBER/TITLE/DATE

*REQUIRED PREPARATION OF AN ACTION PLAN TRACKING PROCESS.

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APPENDIX B

Design FMEA Checklist



Customer or Internal Part No. _____


Question	Yes	No	Comment/Action Required	Responsible	Due Date
1 Was the SFMEA and/or DFMEA prepared using the Key Safety Systems, Inc. Potential Failure Mode and Effectives Analysis (FMEA) <i>reference manual</i>					
2 Have historical campaign and warranty data be reviewed?					
3 Have similar part DFMEAs been considered?					
4 Does the SFMEA and/or DFMEA identify Special Characteristics?					
5 Have design characteristics that affect high risk priority failure modes been identified?					
6 Have appropriate corrective actions been assigned to high risk priority numbers?					
7 Have appropriate corrective actions been assigned to high severity numbers?					
8 Have risk priorities been revised when corrective actions have been completed and verified?					

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APPENDIX C


Design Information Checklist



Customer or Internal Part No.

Question	Yes	No	Comment/Action Required	Responsible	Due Date
A. General					
Does the design require:					
1 *New materials?					
2 *Special tooling?					
3 Has assembly build variation analysis been considered?					
4 Has Design of Experiments been considered?					
5 Is there a plan for prototypes in place?					
6 Has a DFMEA been completed?					
7 Has a DFMA been completed?					
8 Have service and maintenance issues been considered?					
9 Has the Design Verification Plan been completed?					
10 If yes, was it completed by a cross functional team?					
11 Are all specified tests, methods, equipment and acceptance criteria clearly defined and understood?					
12 Have Special Characteristics been selected?					
13 Is bill of material complete?					
14 Are Special Characteristics properly documented?					
B. Engineering Drawings					
15 Have dimensions that affect fit, function and durability been identified?					
16 Are reference dimensions identified to minimize inspection layout time?					
17 Are sufficient control and datum surfaces identified to design functional gages?					
18 Are tolerance compatible with accepted manufacturing standards?					
19 Are there any requirements specified that cannot be evaluated using known inspection techniques?					
C. Engineering Performance Specifications					
20 Have all special characteristics been identified?					
21 Is test loading sufficient to provide all conditions, i.e., production validation and end use?					
22 Have parts manufactured at minimum and maximum specifications been tested?					
23 Can additional samples be tested when a reaction plan requires it, and still conduct regularly scheduled in-process tests?					
24 Will all product testing be done in-house?					
25 If not, is it done by an approved subcontractor?					
26 Is the specified test sampling size and /or frequency feasible?					
27 If required, has customer approval been obtained for test equipment?					
D. Material Specifications					
29 Are specified materials, heat treat and surface treatments compatible with the durability requirements in then identified environment?					

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APPENDIX D
New Equipment, Tooling & Test



Customer or Internal Part No.

Question	Yes	No	Comment/Action Required	Responsible	Due Date
Has tool and equipment design provide for:					
1 * Flexible systems, e.g. cell mfg?					
2 * Quick change?					
3 * Volume Fluctuations?					
4 * Mistake proofing?					
Have lists been prepared identifying:					
5 * New equipment?					
6 * New tooling?					
7 * New test equipment?					
Has acceptance criteria been agreed upon for:					
8 * New equipment?					
9 * New tooling?					
10 * New test equipment?					
11 Will a preliminary capability study be conducted at the tooling and/or equipment manufacturer?					
12 Has test equipment feasibility and accuracy been established?					
13 Is a preventive maintenance plan complete for equipment and tooling?					
14 Are set up instructions for new equipment and tooling complete and understandable?					
15 Will capable gages be available to run preliminary process capability studies at the equipment supplier's facility?					
16 Will preliminary process capability studies be run at the producing plant?					
17 Have process characteristics that affect special product characteristics been identified?					
18 Were special product characteristics used in determining acceptance criteria?					
19 Does the manufacturing equipment have sufficient capability to handle forecasted production and service volumes?					
20 Is testing capacity sufficient to provide adequate testing?					


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APPENDIX E


Product Process Quality



Customer or Internal Part No.

Question	Yes	No	Comment/Action Required	Responsible	Due Date
1 Is the assistance of the customer's quality assurance or product engineering activity needed to develop or concur to the control plan?					
2 Has the supplier identified who will be the quality liaison with the customer?					
3 Has the supplier identified who will be the quality liaison with its suppliers?					
4 Has the quality system been reviewed using the KSSI Quality System Assessment?					
Are there sufficient personnel identified to cover:					
5 * Control plan requirements?					
6 * Layout inspection?					
7 * Engineering performance testing?					
8 * Problem resolution analysis?					
Is there a documented training program that :					
9 * Includes all employees?					
10 * Lists those who have been trained?					
11 * Provides a training schedule					
Has training been completed for:					
12 * Statistical process control?					
13 * Capability studies?					
14 * Problem solving?					
15 * Mistake proofing?					
16 * Other topics as identified?					
17 Is each operation provided with process instructions that are keyed to the control plan?					
18 Are standard operator instructions available at each operations?					
19 Were operator/team leaders involved in developing standard operator instructions?					
Do inspection instructions included?					
20 * Easily understood engineering performance specifications?					
21 * Test frequencies?					
22 * Sample sizes?					
Do inspection instructions included?					

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**APPENDIX F
Floor Plan Checklist**



Customer or Internal Part No. _____


Question	Yes	No	Comment/Action Required	Responsible	Due Date
1 Does the floor plan identify all required process and inspection points?					
2 Have clearly marked areas for all material, tools, and equipment at each operations been considered?					
3 Has sufficient space been allocated for all equipment?					
Are process and inspection areas:					
4 * Of adequate size?					
5 * Properly lighted?					
6 Do inspection areas contained necessary equipment and files?					
Are there adequate:					
7 * Staging areas?					
8 * Impound areas?					
9 Are inspection points logically located to prevent shipment to nonconforming products?					
10 Have controls been established to eliminate the potential for an operation, including outside processing to contaminate or mix similar products?					
11 Is material protected from overhead or air handling systems contamination?					
12 Have final audit facilities been provided?					
13 Are controls adequate to prevent movement of nonconforming incoming material to storage or point of use?					

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APPENDIX G
Process Flow Chart Checklist



Customer or Internal Part No. _____


	Question	Yes	No	Comment/Action Required	Responsible	Due Date
1	Does the flow chart illustrate the sequence of production and inspection stations?					
2	Were all appropriate FMEAs (SFMEA, DFMEA) available and used as aids to develop the process flow chart?					
3	Is the flow chart keyed to product and process checks in the control plan?					
4	Does the flow chart describe how the product will move, i.e., roller conveyor, slide containers, etc.?					
5	Has the pull system/optimization been considered for this process?					
6	Have provisions been made to identify and inspect reworked products before being used?					
7	Have potential quality problems due to handling and outside processing been identified and corrected?					

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APPRNDIX H
Process FMEA Checklist



Customer or Internal Part No. _____


Question	Yes	No	Comment/Action Required	Responsible	Due Date
1 Was the Process FMEA prepared using the KSS NA guidelines?					
2 Have all operations affecting fit, functions, durability, governmental regulations and safety been identified and listed sequentially?					
3 Were similar part FMEAs conducted?					
4 Have historical campaign and warranty data been reviewed?					
5 Have appropriate corrective actions been planned or taken for high risk priority numbers?					
6 Have appropriate corrective actions been planned or taken for high risk severity numbers?					
7 Were risk priorities numbers revised when corrective action was completed?					
8 Were risk severity numbers revised when corrective action was completed?					
9 Do the effects consider the customer in terms of the subsequent operations, assembly and products?					
10 Was warranty information used as an aid in developing the Process FMEA?					
11 Were customer plant problems used as an aid in developing the Process FMEA?					
12 Have the causes been described in terms of something that can be fixed or controlled?					
13 Where detection is the major factor, have provisions been made to control the cause prior to the next operations?					

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APPENDIX I
Control Plan Checklist



Customer or Internal Part No. _____

Question	Yes	No	Comment/Action Required	Responsible	Due Date
1 Was the control plan methodology referred in Section 6 used in preparing the control plan?					
2 Have all known customer concerns been identified to facilitate the selection of special product/process characteristics?					
3 Are all special product/process characteristics included in the control plan?					
4 Were SFMEA, DFMEA, and PFMEA used to prepare the control plan?					
5 Are material specifications requiring inspection identified?					
6 Does the control plan addressing incoming (material/components) through processing/assembly including packaging?					
7 Are engineering performance testing requirements identified?					
8 Are gages and test equipment available as required by the control plan?					
9 If required, has the customer approved the control plan?					
10 Are gage methods compatible between supplier and customer?					

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