Advanced Product Quality Planning (APQP) Status Reporting Guideline

This document is located on the Ford Intranet at:
http://www.quality.ford.com/apqp/
or the FSN Website at:
https://web.bli.ford.com/

This Guideline is published by Ford Motor Company, Quality Office

Foreword

Ford Motor Company launched an Advanced Product Quality Planning Status Reporting Guideline (APQP) Fast Start Initiative in December 1994. A cross-functional APQP team was formed to review the existing FAO Procedures and target best practices. The 1994 version of this document was created at that time, to be in line with the AIAG Advanced Product Quality Planning and Control Plan Manual.

Since that time, the external suppliers to Ford Motor Company, and internal suppliers within Ford have used the FAO APQP Status Reporting Guideline to monitor their own systems with regard to APQP.

A cross-functional team was formed in 1999/2000, which continues today to periodically review this manual and update it accordingly to current best practices, and FPDS processes. This manual contains references (at the time of publishing) to the FPDS Process Sheets. All of this has been done to clarify further the appropriateness of the APQP process, and its direct tie to the existing systems/process Ford currently has in place.

Furthermore, it is intended that the updated APQP process and FPDS timing information will assist the external supply base in understanding the differences between their own timing requirements, and those which need to be met by the entire Vehicle Program in the delivery of a new vehicle.

This Guideline documents the Ford APQP evaluation and status reporting process. It does not replace the AIAG Advanced Product Quality Planning and Control Plan Reference Manual as the basis for quality planning.

Questions regarding this process, please contact the following:

Supplier APQP concerns:

- NAT - Ranga Rajan (313) 33-75383
- NAC - Debra Keller (313) 32-31735

New Model Programs:

- Craig Fike (313) 32-21765

PTO Program Launches:

- Internal Make Parts/Internal Suppliers – Larry Berard (313) 32-29256
  (note: PT internal suppliers refer to PTP 07-137)

Stamping Business Unit Program Launches (SBU):

- Jesse Jou (313) 39-03246

APQP Guideline changes:

- Steve Opaleski (313) 32-20941

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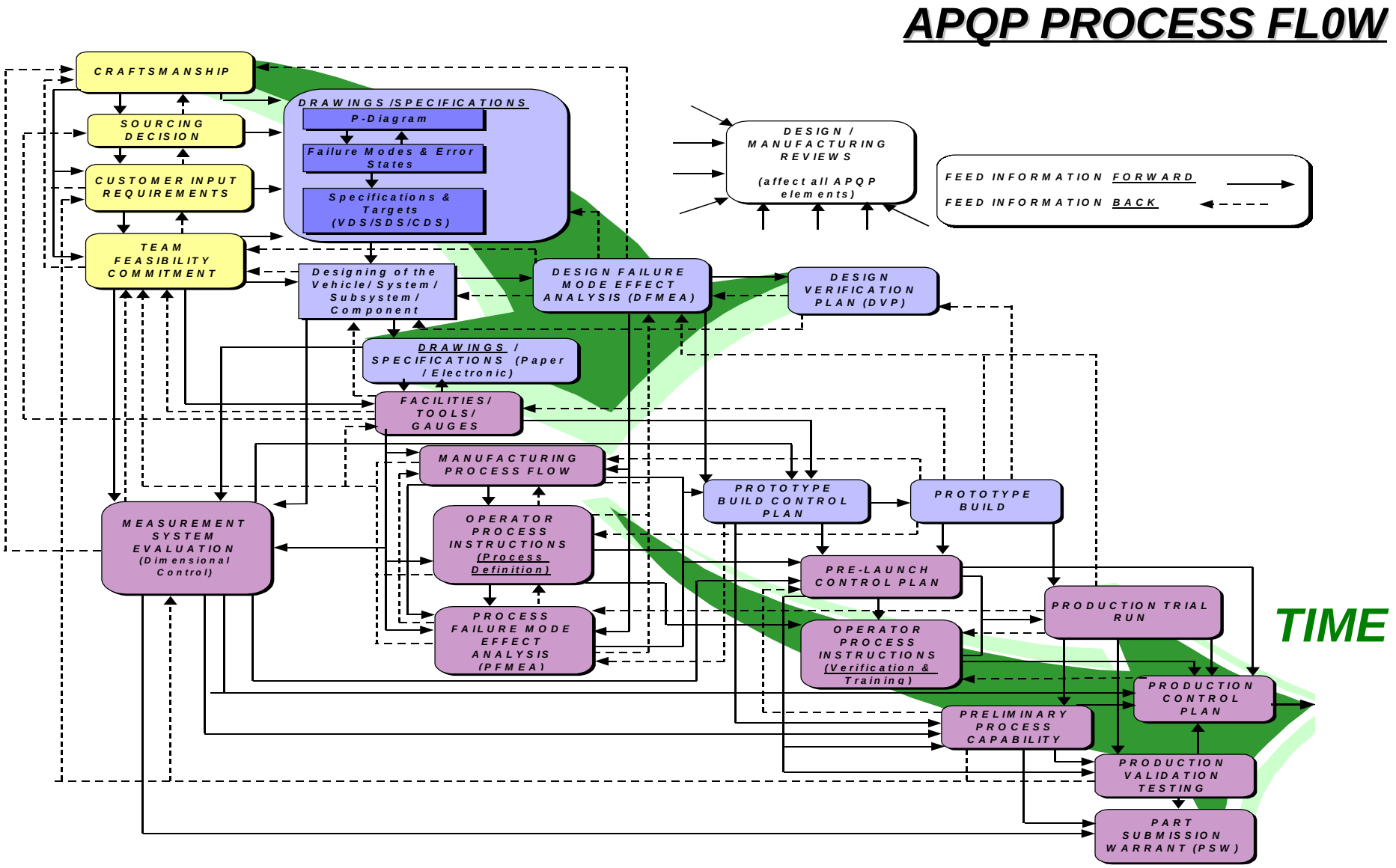


Fundamentals of the APQP Process

Advanced Product Quality Planning (APQP)

Advanced Product Quality Planning (APQP) is a structured method for defining and executing the actions necessary to ensure a product satisfies the customer. APQP is program and supplier-led and is required of all system, subsystem and component manufacturing locations. This includes both internal and external suppliers to Ford.

The Goal of APQP

The goal of APQP is to facilitate communication between all persons and activities involved in a program and ensure that all required steps are completed on time, with a **high quality-of-event,** at acceptable cost and quality levels.

The Purpose of APQP

The purpose of this status reporting guideline is to establish:

- Common APQP expectations for the internal and external suppliers to Ford Motor Company
- Common APQP process metrics
- A common program status reporting format
- Roles and responsibilities for APQP elements
- A better understanding of how the APQP elements relate to the Ford Product Development System (FPDS), specific FPDS milestones, and their timing

The Approach of APQP

This status reporting guideline describes 23 key APQP disciplines. Ford Motor Company expectations are defined for these key disciplines in definitions, and detailed checklists. The status for these disciplines is summarized using metrics described in the Reporting section.

This status reporting guideline is written from a supplier standpoint. A supplier is an internal or external supplier of materials, components, subsystems, systems, designs or processes that will be delivered to a customer. A customer is the recipient of the supplier's product or process. Besides customers, every supplier will have subcontractors. A subcontractor is the provider of material or parts to a supplier.

The Applicability of APQP

APQP status reporting is a requirement of all internal and external suppliers to Ford (including Ford Product Development). APQP must be done for new programs/parts and major part changes as appropriate. In addition, Product Development Teams are to monitor the status of internal and external engineering and process development disciplines and assess the "Quality-of-Event" as well as the timing and completion of each of the 23 elements.

Teams

The first step in the Advanced Product Quality Planning Process is to assign responsibility to a cross-functional team. Effective product quality planning requires the involvement from all areas within a corporation. The team includes representatives from engineering, manufacturing, material control, purchasing, quality, sales, field service, subcontractors, and customers as appropriate.

Elements

This Status Reporting Guideline describes 23 key APQP disciplines, identified as Ford APQP elements. Please note that there is a slight difference in the 23 elements in this updated version. These elements, when summarized and reported, communicate the status of different levels of a program.

Of the 23 Ford APQP elements, 19 are requirements of the AIAG Advanced Product Quality Planning and Control Plan manual. The four additional elements meet unique Ford requirements for APQP status reporting and communication between supplier and customer.

The 19 industry standard elements are:

- Design FMEA
- Design Verification Plan & Report
- Prototype Build Control Plan
- Manufacturing Process Flow Chart
- Process FMEA
- Pre-Launch Control Plan
- Operation Process Instructions
- Production Control Plan
- Design & Mfg. Review(s)
- Facilities / Tools / Gauges
- Prototype Builds
- Drawings and Specifications
- Team Feasibility Commitment
- Measurement Systems Evaluation
- Packaging Specifications
- Production Trial Run
- Preliminary Process Capability Study
- Production Validation Testing
- Production Part Approval (PSW)

The four Ford unique elements are:

- Sourcing Decision
- Customer Input Requirements
- Subcontractor APQP Status
- Craftsmanship

APQP Flow

The chart on page 6 of this section is an overall summary of the APQP process. It is intended to show that APQP is NOT just a feed forward process, but it also includes feeding information back, updating documents in an iterative fashion, and using information and lessons learned from a program for future programs.

The APQP Process includes five main functions:

1. Planning of the APQP elements
2. Execution of the APQP elements
3. Monitoring the "Quality-of-Event" of the execution of the elements, as well as the timing, by the team in-between FPDS milestones
4. Issues Resolution
5. Status Reporting (minimum at FPDS milestones)

Roles

The roles matrix in Appendix A defines the lead and support roles for Vehicle Operations and Product Development. Under the VO/PD matrix, the APQP Status Reporting is as follows: Vehicle Operations Program Launch Manager reports the status on VO Internal Suppliers, and Product Development Team Leaders will report on the D & R Engineers' status. Powertrain will report both Internal & External P/T Suppliers (see Powertrain R & R matrix for further detail). STA will report status on External Suppliers as described in their R & R matrix.

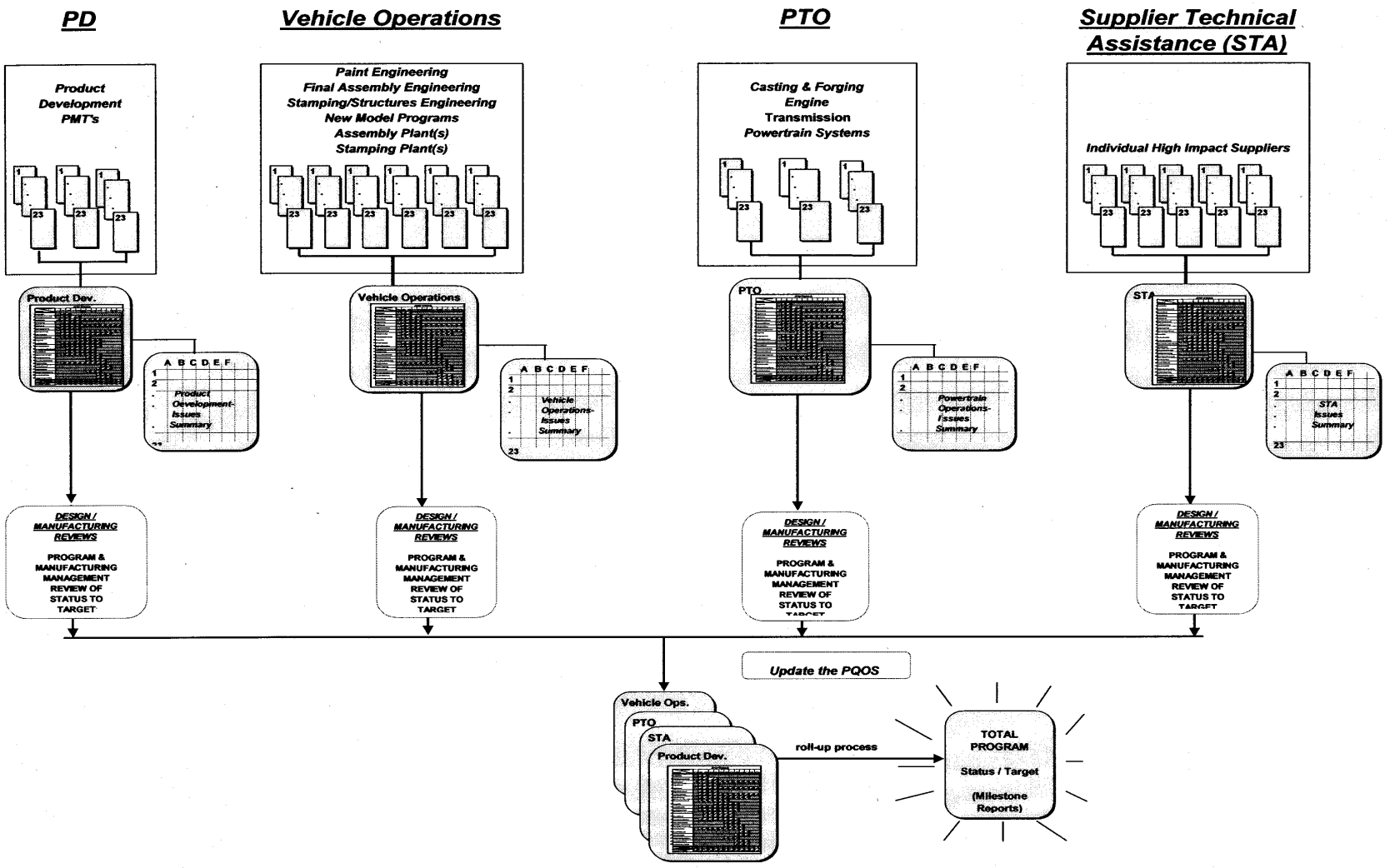
This Roles and Responsibilities matrix can be used to derive other tables specific to each organization's requirements for element responsibility and status reporting.

Responsibilities

Responsibilities for the activities are identified in the checklist, and references to FPDS process sheets are in the element descriptions. A Quality-of-Event checklist is provided for each element to assist in understanding the Expectations for each element. Rating history, FPDS timing requirements, and Expectations due at certain points in the program are described.

APQP Reporting Process

APQP Status Reporting Flow Chart



APQP Status Report

The Ford APQP Status Report summarizes the program status using the 23 Ford APQP elements. It summarizes the information and provides an assessment at the component/subsystem level, the system/organization level(s), and finally the program level. The individual issues at each level are to be documented and tracked, as well as raised to management for assistance in solving/closing if they cannot be handled at the working level.

Please note the different levels of reporting, and the summarizing process as shown on page11.

- Submit the Status Report to the customer at all major program reviews (e.g. FPDS Milestones).
- Customers or suppliers shall conduct more frequent status reviews as needed.
- The customer shall provide a list of all scheduled program status review dates to the supplier.
- Submit supporting documentation upon customer request.

The subsystem team completes the status report for its product, with component supplier status summarized on the Subcontractor APQP status line. The subsystem teams submit the report to their customer, the system team.

The system/organization team will then complete the status report for their product, with their subsystem supplier status summarized onto the Subcontractor APQP status line. The system teams submit the data to their customer, the vehicle team.

Ratings and Assessment

G/Y/R Status

Green-Yellow-Red status communicates the progress toward the successful completion of an APQP Element by the program need date. Program need date is the last possible date an element can be completed and not adversely affect quality or timing of the program. The “GYR Status” column of the report shows the assessment for each element.

Definitions/Risk factors for Green, Yellow, and Red are listed in the table below.

DEFINITIONS		
Risk/Status Assessment		
Risk	**Color**	**Definition**
High	Red	Target dates and/or deliverables are at risk. A recovery work plan is not available and/or implemented, or the work plan does not achieve program targets.
Moderate	Yellow	Target dates and/or deliverables are at risk, but a resourced recovery work plan has been developed to achieve program targets, and has been approved by the appropriate Management Team.
None	Green	Target dates and deliverables are on track and meeting objectives.

APQP Status Report Form

Advanced Product Quality Planning
Status Report

Supplier/Org:	①	Program:	⑤	Part Name:	⑨
Location:	②	Model Year:	⑥	Part Number:	⑩
Supplier Code:	③	FPDS Milestone:	⑦	Notice Level:	⑪
Contact Name/Tel:	④	Review Date:	⑧	User Plant:	⑫

APQP ELEMENT \ FPDS MILESTONE		<SI> yyyy/mm/dd	<SC> yyyy/mm/dd	<PH> yyyy/mm/dd	<PA> yyyy/mm/dd	(ST) yyyy/mm/dd	<PR> yyyy/mm/dd	(CP) yyyy/mm/dd	<CC> yyyy/mm/dd	<LR> yyyy/mm/dd	<LS> yyyy/mm/dd	(J1) yyyy/mm/dd	<FS> yyyy/mm/dd
1.	Sourcing Decision	⑬											
2.	Customer Input Requirements												
3.	Craftsmanship												
4.	Design FMEA												
5.	Design/Manufacturing Review(s)												
6.	Design Verification Plan & Report												
7.	Subcontractor PSW Status												
8.	Facilities, Tools & Gages												
9.	Prototype Build Control Plan												
10.	Prototype Build(s)												
11.	Drawings & Specifications												
12.	Team Feasibility Commitment												
13.	Manufacturing Process Flowchart												
14.	Process FMEA												
15.	Measurement Systems Evaluation												
16.	Pre-Launch Control Plan												
17.	Operator Process Instructions												
18.	Packaging Specifications												
19.	Production Trial Run												
20.	Production Control Plan												
21.	Preliminary Process Capability Study												
22.	Production Validation Testing												
23.	Part Submission Warrant (PSW)												
OVERALL APQP STATUS RATING (GYR)		⑭	⑮				⑯			⑰		⑱	

Element / Activity		Issue(s) for Red/Yellow Elements	Corrective Action / Resolution Plan	Timing		Responsibility	
#	Activity	(summarize the concern & resulting risk)	(e.g. revise timing, allocate resources)	Open	Close	Ford	Supplier

Filling Out the Status Report Form

The following section describes how to fill in each of the fields on the Status Report. Refer to the status report example on the previous page for the number in each field.

1. Org/Supplier
Enter your organization or your company name. If you are delivering the product to another department within the manufacturing facility, a department number or group name may be entered here.

2. Location
Enter the location of the facility manufacturing the system/subsystem or component if applicable.

3. Supplier Code
Enter the UCCS code for the manufacturing facility if applicable.

4. Contact Name/Telephone Number
Identify Program Manager and phone number.

5. Program
Enter the name of the program.

6. Model Year
Enter the Model Year of the program.

7. FPDS Milestone/Team Event
Enter the current FPDS Milestone / Team Event that you will be reporting on.

8. Review Date
Enter the date of the review of this report.

9. Part Name
Enter the name of the part being reviewed (if applicable).

10. Part Number
Enter the part number of the part being reviewed (if applicable).

11. Notice Level
Enter the notice level of the part being reviewed (if applicable).

12. User Plant
Enter the plant(s) where this vehicle / engine / transmission will be built.

Filling Out the Status Report Form (cont.)

13. G/Y/R Status
Enter status for the 23 Elements

14. Element / Activity
Enter your home Element Number for which the issue is being reported and the Activity reporting on the issue.

15. Issue(s) for Red/Yellow Elements
Summarize the concern and resulting risk here.

16. Corrective Action / Resolution Plan
Enter a summary of the corrective action for the issue being addressed and the resolution plan to correct the issue (an 8D that is tracking the issue may be referenced here).

17. Timing
Enter the Open date for the issue, and when it is resolved, enter the closing date.

18. Responsibility
Enter the name of the Ford Motor Company and/or the Supplier person responsible for follow-up on this issue.

Quality of Event Checklists

In Appendix B, is an example of a completed Quality-of-Event Checklist along with the website location of the Excel file that contains the 23 Element Checklists. These checklists cover the basic requirements for successful completion of the elements, but may not be inclusive. These checklists are to be used as a guideline in assessing your status. The Element expectations on these checklists have been grouped for Milestone reporting following the FPDS process. The boxed areas should be completed by the appropriate milestone. For next milestone report requirements, update the previous milestone boxed areas as needed. The APQP Status Report Form is linked to the checklists and the Information Worksheet for ease of reporting.

Risk Assessment

Every APQP team should conduct a risk assessment as soon as possible after forming the team. The purpose of the risk assessment is to determine what elements in the APQP process a supplier, organization, or program team must complete. Reference Appendix B, for an example of a risk assessment form.

Risk Assessment (cont.)

Elements to be evaluated in the Risk Assessment include:

1) Quality History

- High warranty or Things Gone Wrong (TGWs) on current model or surrogate product
- Frequent Quality Rejects (QRs) and/or campaigns at the receiving plant (Assy & Stmp. Plants, Supplier Plants, etc.)
- Similar component or system was the cause of a recall action

2) Supplier Profile

- New supplier or new manufacturing location
- Product or manufacturing technology is new to the supplier manufacturing location
- Supplier's historic launch performance is poor
- Supplier resources are stretched due to significant amount of new business
- Supplier location is not Q1 or is a Q1 revoked-supplier

3) Engineering Profile

- New design
- Manufacturing techniques are new to the industry
- Similar products are subject to numerous design changes that threaten program timing
- High product or process complexity
- Product is strategically important due to high visibility or functional performance

4). Performance versus Targets

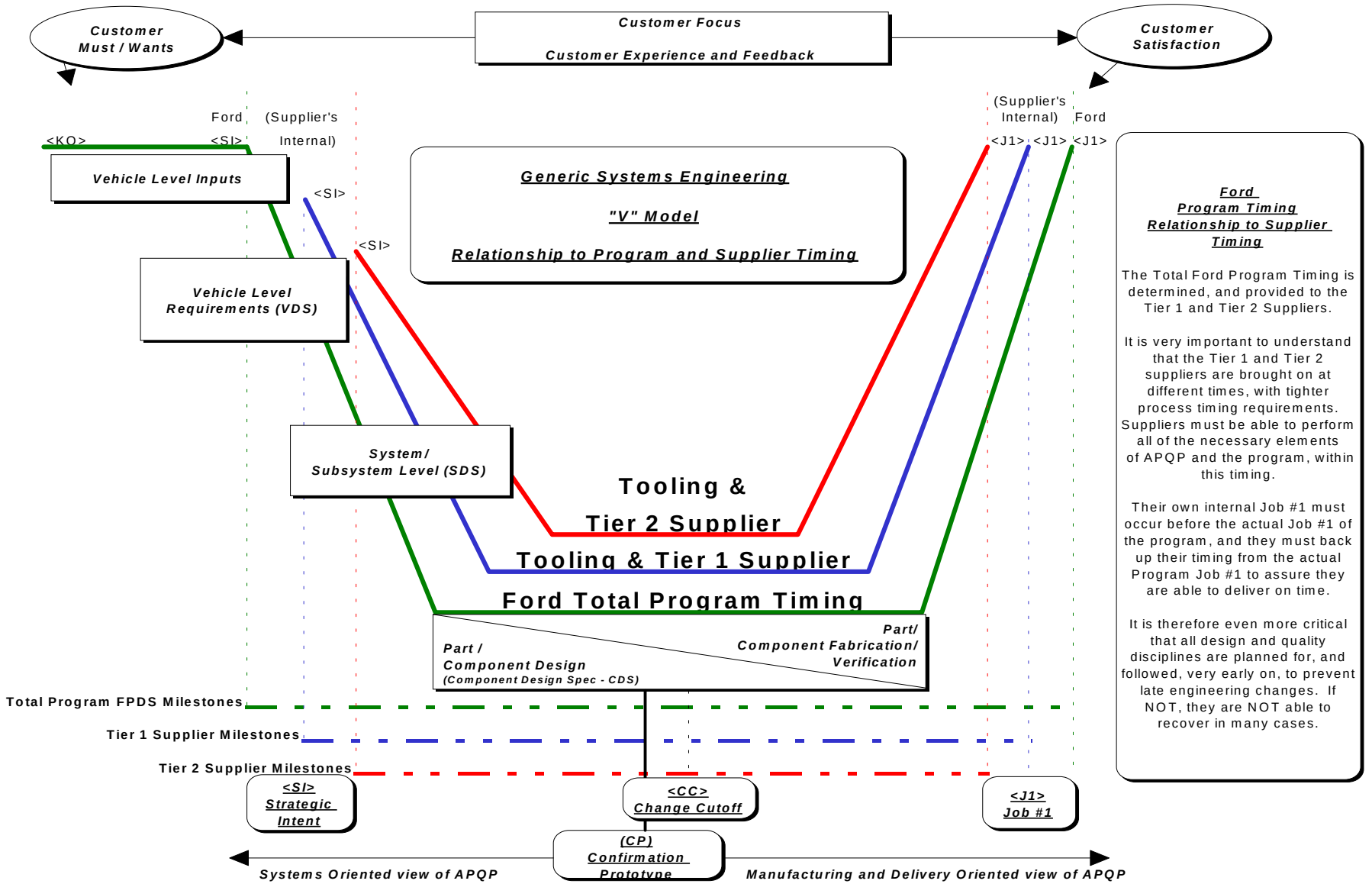
- Design goals (weight, materials, functional performance, etc.) will be difficult to achieve
- Reliability goals will be difficult to achieve
- Quality goals (warranty, TGWs, scrap rates, rework rates, etc.) will be difficult to achieve
- Program timing is compressed
- Cost targets are aggressive

5). Adjustments

If any of the concerns listed above are present, the customer may require all APQP elements to be completed and reported. If the program is considered to be low risk, the supplier may skip certain APQP elements. For example, if the product is carryover with minor changes, existing control plans may be used, and packaging evaluations may not be required. The customer must agree in writing to all deviations from the APQP process. If the customer and the supplier agree that an element/expectation is not required, the supplier should write "NA" for not applicable in the corresponding Milestone column on the Quality-of-Event Checklists.

APQP Timing

Ford / Supplier Systems "V" Model



Ford Program Timing Relationship to Supplier Timing

The Total Ford Program Timing is determined, and provided to the Tier 1 and Tier 2 Suppliers.

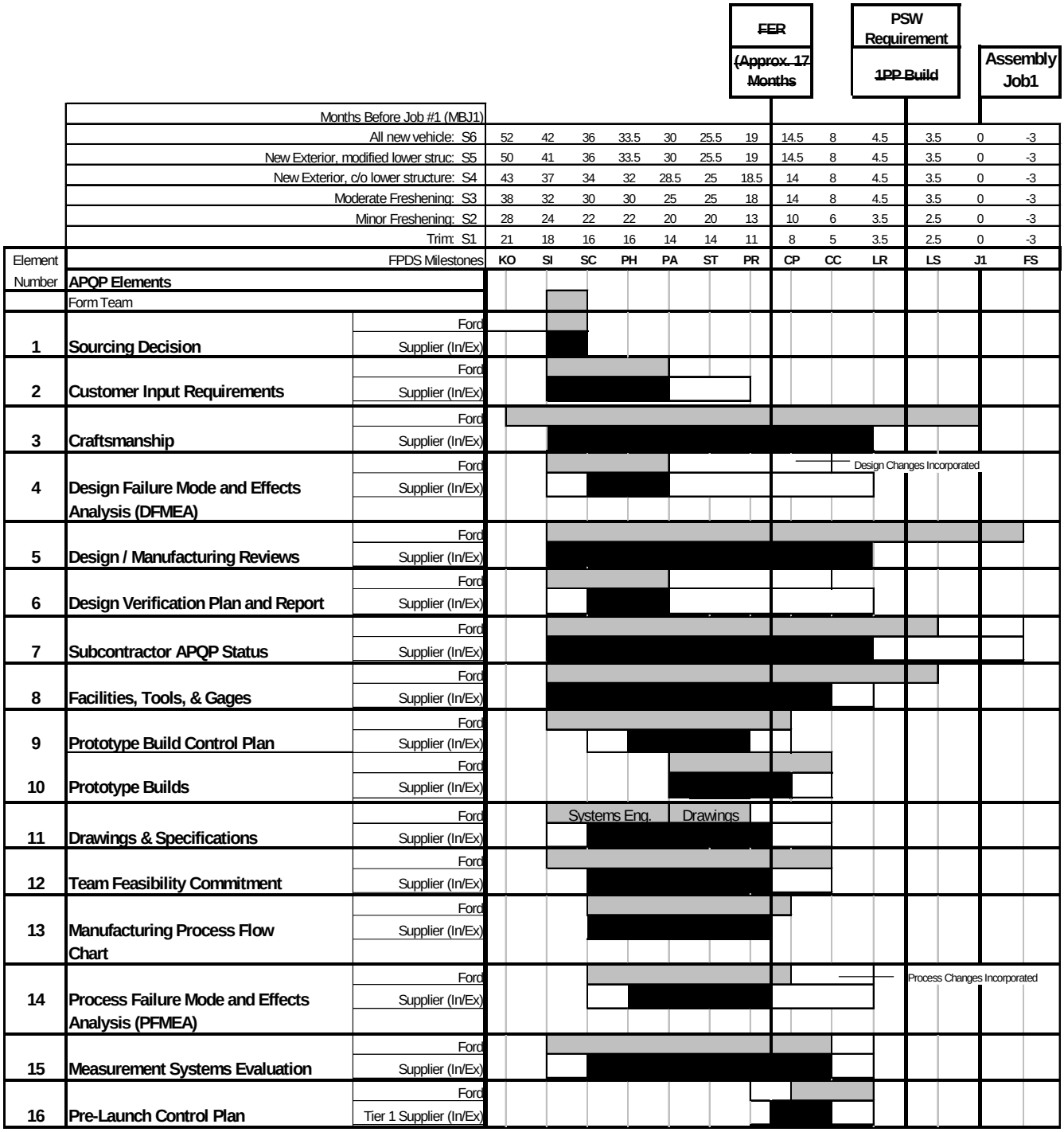
It is very important to understand that the Tier 1 and Tier 2 suppliers are brought on at different times, with tighter process timing requirements. Suppliers must be able to perform all of the necessary elements of APQP and the program, within this timing.

Their own internal Job #1 must occur before the actual Job #1 of the program, and they must back up their timing from the actual Program Job #1 to assure they are able to deliver on time.

It is therefore even more critical that all design and quality disciplines are planned for, and followed, very early on, to prevent late engineering changes. If NOT, they are NOT able to recover in many cases.

APQP Generic Program Timing Gantt Chart

~~APQP Generic Program Timing Gantt Chart~~



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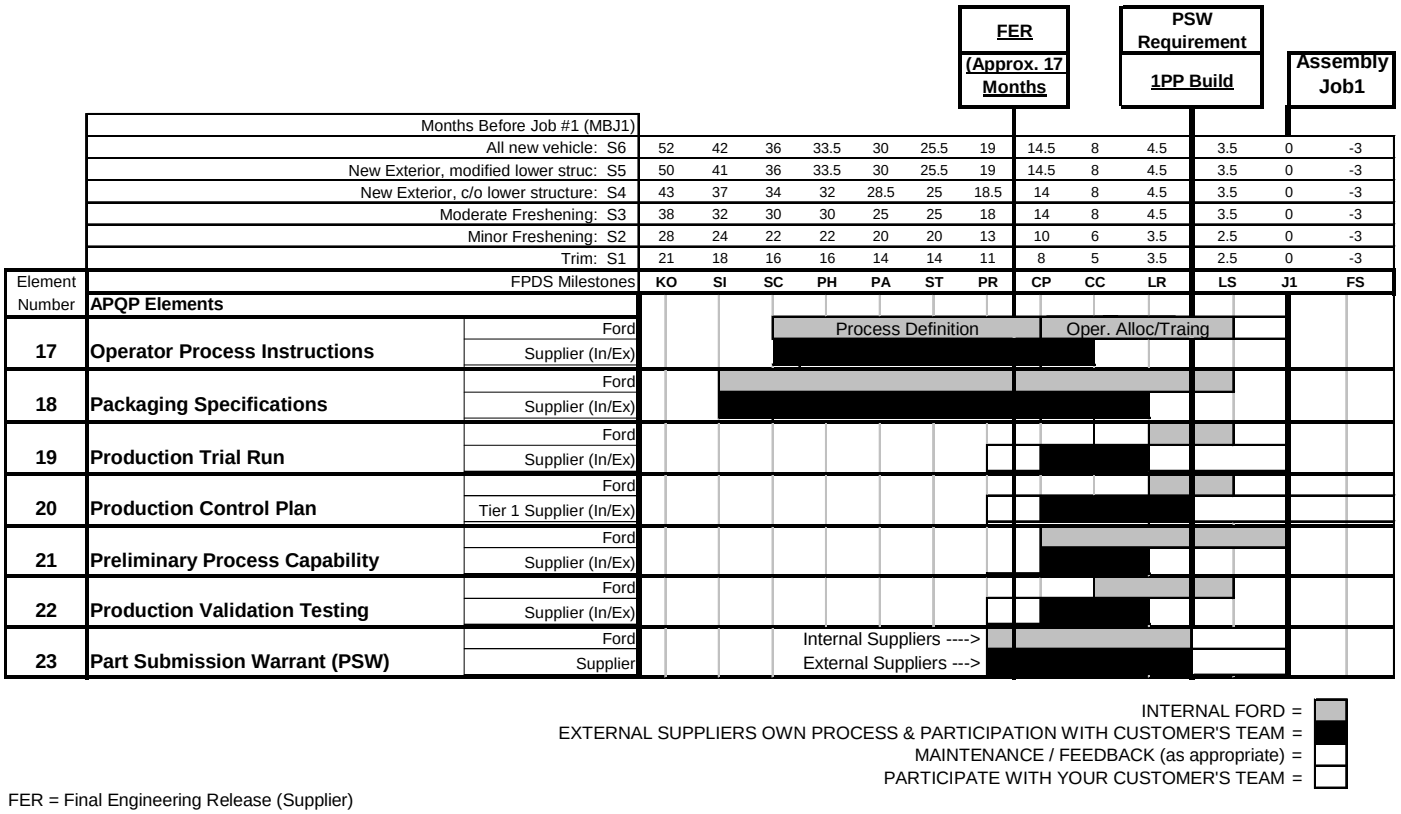
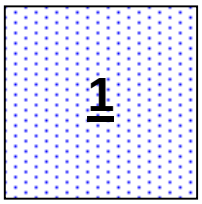
APQP Generic Program Timing Gantt Chart



INTERNAL FORD =
EXTERNAL SUPPLIERS OWN PROCESS & PARTICIPATION WITH CUSTOMER'S TEAM =
MAINTENANCE / FEEDBACK (as appropriate) =
PARTICIPATE WITH YOUR CUSTOMER'S TEAM =

FER = Final Engineering Release (Supplier)

APQP Elements



Sourcing Decision

Overview

Sourcing Decision is a formal customer commitment to work with the supplier on the program. The goal of the Sourcing element in APQP is to assure that all Internal and External Part Suppliers, Tooling Suppliers, and Facility Suppliers are on board with the program early (e.g. by SC) to allow for them to understand all of the Vehicle Program timing and requirements. The Suppliers are to make sure that all of their Sub-suppliers are also on board to fulfill the Vehicle Program requirements, as soon as possible.

The Sourcing Decision is to be made using appropriate Quality History, and Customer Input data to assure that the supplier is capable of meeting all requirements.

APQP Expectations for this element are described in the associated Quality-of-Event Checklist. The Checklist is used to plan for the element, and the Vehicle Program's FPDS milestone dates shall be understood and applied to the generically shown timing. This is done to make the Checklist specific for the supplier and the program.

Timing

Planning is aligned with FPDS Milestones (KO) to <SC>.

Associated FPDS Process Sheets include (but are not limited to):

1.3.2.16.3 Develop Phase I & II Early Sourcing Workplan
1.3.2.16.4 Update Sourcing Assumptions for Major Vehicle Systems to <SI> Level
1.3.2.16.8 Develop Phase III Early Sourcing Workplan
4.1.1.1.1.1 Develop Phase 1 Sourcing Agreement
4.1.1.1.2.1 Develop Phase II Sourcing Agreement
4.1.1.1.3.1 Develop Phase III Sourcing Agreement

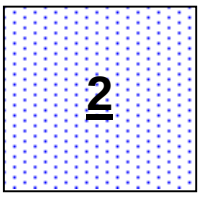
Linkage

Key APQP Elements that are input to "Sourcing Decision " include (but are not limited to):

Customer Input
Craftsmanship

Key APQP Elements that "Sourcing Decision" will provide output information to include (but are not limited to):

Customer Input



Customer Input Requirements

Overview

Customer Input Requirements are the design criteria and the program requirements necessary to initiate the Advanced Product Quality Planning process. They include Design Goals, Reliability and Quality Goals, Program Timing, Affordable Cost Targets, Capacity Planning Volumes, Key Contact Personnel, and input requested from & supplied by the Manufacturing Facilities involved. This is done to assure that any current Manufacturing/Process issues are addressed appropriately by the new design and process, early in the Product Development cycle.

APQP Expectations for this element are described in the associated Quality-of-Event Checklist. The Checklist is used to plan for the element, and the Vehicle Program's FPDS milestone dates shall be understood and applied to the generically shown timing. This is done to make the Checklist specific for the supplier and the program.

Timing

Planning is aligned with FPDS Milestones <SI> to <PA>.

Associated FPDS Process Sheets include (but are not limited to):

4.6.2	Integrate Quality & Reliability Discipline Implementation Plan into PMT/PAT Workplan (Inc. APQP & Campaign Prevention)
1.1.26.1	Develop Prioritized Customer Satisfaction, Quality and Reliability Data
1.3.1.9.1	Establish Initial Customer Satisfaction, Quality and Reliability Plans
1.3.1.9.2	Finalize Customer Satisfaction, Quality & Reliability Plans

Linkage

Key APQP Elements that are input to "Customer Input" include (but are not limited to):

Sourcing Decision
Craftsmanship

Key APQP Elements that "Customer Input" will provide output information to include (but are not limited to):

Drawings & Specifications (Including P-Diagram information, Failure Mode & Effects of Failure Modes, Design Specifications (VDS/SDS/CDS)).
Facilities / Tools / Gauges
Manufacturing Process Flow

Craftsmanship

3

Overview

Craftsmanship is an assessment of what the customer sees, touches, uses, hears, and smells. It impacts design and manufacturing, and improves the overall perception of value.

APQP Expectations for this element are described in the associated Quality-of-Event Checklist. The Checklist is used to plan for the element, and the Vehicle Program's FPDS milestone dates shall be understood and applied to the generically shown timing. This is done to make the Checklist specific for the supplier and the program

Timing

Planning is aligned with FPDS Milestones (KO) to (J1).

.

Associated FPDS Process Sheets include (but are not limited to):

2.4.3 +	Develop Appearance (and its sub-processes)
1.3.1.1.1	Review Strategies and Plans at <PS1>
1.3.1.1.3	Review Strategies and Plans at <S!>
1.3.1.1.4	Review Strategies and Plans at <SC>
4.3.6.1	Conduct Craftsmanship Pre <SI> Gateway Review
4.3.6.3	Conduct Craftsmanship Pre <PA> Gateway Review
4.3.6.5	Conduct Craftsmanship Pre <PR> Gateway Review
4.3.6.6	Conduct Craftsmanship Post <CP> Gateway Review

Linkage

Key APQP Elements that are input to "Craftsmanship" include (but are not limited to):

Sourcing Decision
Customer Input
Design Reviews

Key APQP Elements that "Craftsmanship" will provide output information to include (but are not limited to):

Sourcing
Customer Input
Drawings & Specifications (Including P-Diagram information, Failure Mode & Effects of Failure Modes, Design Specifications (VDS/SDS/CDS)).
Prototype Builds
PSW (Color/Appearance)

4

Design Failure Mode and Effects Analysis (DFMEA)

Overview

A Design or Concept FMEA is a systematic approach; used by a design responsible team, to assure that potential design failure modes and their associated causes have been considered and addressed. DFMEA's are to be done concurrently with the design process to allow for the determined Recommended Actions to positively affect the design.

Output from the Design FMEA (e.g. potential Special Characteristics) should also be used when creating and analyzing the Process FMEA, and the Control Plans.

APQP Expectations for this element are described in the associated Quality-of-Event Checklist. The Checklist is used to plan for the element, and the Vehicle Program's FPDS milestone dates shall be understood and applied to the generically shown timing. This is done to make the Checklist specific for the supplier and the program.

Timing

Planning is aligned with FPDS Milestones <SI> to <PA>, with updates to <CC>.

Associated FPDS Process Sheets include:

2.1.11.1	Create Program Plan for Design FMEAs
2.1.11.2	Create Design Failure Mode Effects Analysis Document
2.1.11.4.1	Update Design Failure Mode Effects Analysis (with Robustness Linkages) Document for <CC>
4.6.2	Integrate Quality & Reliability Discipline Implementation Plan into PMT/PAT Workplan (Inc. APQP & Campaign Prevention)

Linkage

Key APQP Elements that are input to "Design Failure Mode and Effects Analysis (DFMEA)" include (but are not limited to):

Drawings & Specifications (Including P-Diagram information, Failure Mode & Effects of Failure Modes, Design Specifications (VDS/SDS/CDS))
Updates determined from the Design Verification Plan (DVP)
Updates determined from the Process Failure Mode and Effects Analysis (PFMEA)
Updates determined from the Prototype Build
Updates determined from the Production Trial Run

Design Failure Mode and Effects Analysis (DFMEA) – (Cont.)

Key APQP Elements that "Design Failure Mode and Effects Analysis (DFMEA)" will provide output information to include (but are not limited to):

- Drawings & Specifications
- Design Verification Plan (DVP)
- Facilities / Tools / Gauges
- Manufacturing Process Flow
- Operator Process Instructions (Process definitions)
- Process Failure Mode and Effects Analysis
- Prototype Build Control Plan

Design / Manufacturing Reviews

Overview

For Suppliers, Design Reviews are regularly scheduled meetings led by the supplier's design activity and must include other affected areas. Manufacturing Reviews are regularly scheduled meetings used to monitor the status of the manufacturing process development.

Within Ford, Design Reviews are held by the Program Teams. Manufacturing Reviews are reviews of the Manufacturing Design, Tooling, Equipment & Facilities.

Both types of reviews are a series of data driven verification activities, and not just a Status Reporting exercise. These reviews are an effective method to prevent problems and misunderstandings; they also provide a mechanism to monitor progress, resolve issues, and report to management.

APQP Expectations for this element are described in the associated Quality-of-Event Checklist. The Checklist is used to plan for the element, and the Vehicle Program's FPDS milestone dates shall be understood and applied to the generically shown timing. This is done to make the Checklist specific for the supplier and the program.

Timing

Planning is aligned with FPDS Milestones <SI> to <LR> (suppliers), and to (J1) (Ford).

Associated FPDS Process Sheets include:

N/A

Linkage

Key APQP Elements that are input to "Design/Manufacturing Reviews " include (but are not limited to):

All APQP Elements

Key APQP Elements that "Design/Manufacturing Reviews " will provide output information to include (but are not limited to):

All APQP Elements

6

Design Verification Plan & Report (DVP&R)

Overview

The Design Verification Plan is a document that lists the engineering evaluations and tests required to establish that the design is fit for use in its intended environment.

APQP Expectations for this element are described in the associated Quality-of-Event Checklist. The Checklist is used to plan for the element, and the Vehicle Program's FPDS milestone dates shall be understood and applied to the generically shown timing. This is done to make the Checklist specific for the supplier and the program.

Timing

Planning is aligned with FPDS Milestones <SI> to <PA> with updates and reporting to <CC>.

Associated FPDS Process Sheets include (but are not limited to):

1.5.1.4.5	Develop Vehicle DVP
1.5.1.5.5	Develop System DVP
1.5.1.6.5	Develop Sub-system Level 1 DVP
1.5.1.7.5	Develop Sub-system Level 2 DVP
1.5.1.8.4	Develop End-item Component DVP
2.1.2	Generate Preliminary Design Proposal (new,modified, c/o)

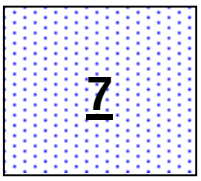
Linkage

Key APQP Elements that are input to "Design Verification Plan (DVP&R)" include (but are not limited to):

Drawings & Specifications (Including P-Diagram information, Failure Mode & Effects of Failure Modes, Design Specifications (VDS/SDS/CDS)).
Design Failure Mode and Effects Analysis (DFMEA)
Prototype Builds

Key APQP Elements that "Design Verification Plan (DVP&R) " will provide output information to include (but are not limited to):

Design Failure Mode and Effects Analysis (DFMEA)



Sub-Contractor APQP Status

Overview

The Subcontractor APQP Status identifies and reports on the condition of an External Supplier or Subcontractor's APQP process. It is required that Internal suppliers (within Ford) & External suppliers cascade APQP requirements to their sub-suppliers or sub-contractors, and conduct APQP reviews as appropriate. The results of those reviews are summarized in Element 7 (Subcontractor APQP Status) of the APQP Status Report.

APQP Expectations for this element are described in the associated Quality-of-Event Checklist. The Checklist is used to plan for the element, and the Vehicle Program's FPDS milestone dates shall be understood and applied to the generically shown timing. This is done to make the Checklist specific for the supplier and the program.

Timing

Planning is aligned with FPDS Milestones <SI> to <LS>.

Associated FPDS Process Sheets include:

N/A

Linkage

Key APQP Elements that are input to "Sub-Contractor APQP Status" include (but are not limited to):

All appropriate APQP Elements for the next lower level external supplier

Key APQP Elements that "Sub-Contractor APQP Status" will provide output information to include (but are not limited to):

Design/Manufacturing Reviews

8

Facilities / Tools / Gauges

Overview

Facilities, tools, and gauges are those additional, new, refurbished, and relocated resources required to produce the product at the customer specified quantity and quality levels. Expectations for this element include but are not limited to planning, statistical and acceptance criteria, lean manufacturing considerations, qualification of equipment, corrective actions, delivery and setup.

APQP Expectations for this element are described in the associated Quality-of-Event Checklist. The Checklist is used to plan for the element, and the Vehicle Program's FPDS milestone dates shall be understood and applied to the generically shown timing. This is done to make the Checklist specific for the supplier and the program.

Timing

Planning is aligned with FPDS Milestones <SI> to <LS>.

Associated FPDS Process Sheets include:

1.3.1.1.2	Review Strategies and Plans at <SI>
1.3.1.1.4	Review Strategies and Plans at <SC>
1.3.1.1.6	Review Strategies and Plans at <PA>
1.3.1.1.8	Review Strategies and Plans at <PR>
3.7.1.2.4.3	Try-out Assembly Tools & Equipment At Final Production Location

Associated FPDS Sections:

1.5.2	Develop Manufacturing & Tooling Concepts/Specifications
2.2	Design Manufacturing Process, Building, Facilities, Tooling & Equipment and Material Handling
3.8	Build/Ship/Install Manufacturing Facilities, Tooling & Equipment and Material Handling

Linkage

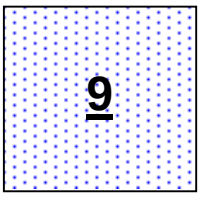
Key APQP Elements that are input to "Facilities / Tools / Gauges" include (but are not limited to):

Team Feasibility Commitment
Drawings & Specifications
Design Failure Mode and Effects Analysis
Measurement System Evaluation
Manufacturing Process Flow
Process Failure Mode and Effects Analysis

Facilities / Tools / Gauges – (cont.)

Key APQP Elements that "Facilities / Tools / Gauges" will provide output information to include (but are not limited to):

Team Feasibility Commitment
Measurement System Evaluation
Manufacturing Process Flow
Operator Process Instructions (Process definitions)
Process Failure Mode and Effects Analysis



Prototype Build Control Plan

Overview

The Prototype Build Control Plan is a description of the dimensional measurements, material, and functional tests that will occur during the confirmation prototype build (e.g. (CP)).

APQP Expectations for this element are described in the associated Quality-of-Event Checklist. The Checklist is used to plan for the element, and the Vehicle Program's FPDS milestone dates shall be understood and applied to the generically shown timing. This is done to make the Checklist specific for the supplier and the program.

Timing

Planning is aligned with FPDS Milestones <SC> to (CP).

Associated FPDS Process Sheets include (but are not limited to):

| 1.3.1.1.3 Review Strategies and Plans at <SI>
| 1.3.2.20.1 Develop Quality Control Plans for CP Prototype Builds

Linkage

Key APQP Elements that are input to "Prototype Build Control Plan" include (but are not limited to):

Manufacturing Process Flow
Operator Process Instructions (Process definition)
Process Failure Mode and Effects Analysis (PFMEA)
Measurement System Evaluation
Design Failure Mode and Effects Analysis (DFMEA)

Key APQP Elements that " Prototype Build Control Plan " will provide output information to include (but are not limited to):

Prototype Builds
Pre-Launch Control Plan

10

Prototype Builds

Overview

The Prototype Builds element entails the manufacture or assembly of components, sub-systems, systems, or assembled vehicles (e.g. Confirmation Prototype) that will be supplied to the customer and built prior to the 1PP production trial run.

This element not only includes the actual build process itself, but the preparation for the build.

APQP Expectations for this element are described in the associated Quality-of-Event Checklist. The Checklist is used to plan for the element, and the Vehicle Program's FPDS milestone dates shall be understood and applied to the generically shown timing. This is done to make the Checklist specific for the supplier and the program.

Timing

Planning is aligned with FPDS Milestones <PA> to (CP).

Associated FPDS Process Sheets include (but are not limited to):

3.7.2.1.1.3 Verify Process Sheets During the Confirmation Prototype Build Phase
3.7.2.1.2.2.7 Build First Confirmation Prototype (CP) Unit
3.7.2.1.2.2.8 Build Balance of Confirmation Prototype Units

Associated FPDS Sections:

3.7.2.1.2 Perform Confirmation Prototype Build

Linkage

Key APQP Elements that are input to "Prototype Builds" include (but are not limited to):

Prototype Build Control Plan
Operator Process Instructions (Process definitions)

Key APQP Elements that "Prototype Builds" will provide output information to include (but are not limited to):

Facilities / Tools / Gauges
Manufacturing Process Flow
Operator Process Instructions (Process definitions)
Process Failure Mode and Effects Analysis (PFMEA)
Design Failure Mode and Effects Analysis (DFMEA)
Design Verification Plan (DVP)
Pre-Launch Control Plan
Measurement System Evaluation

11

Drawings & Specifications

Overview

The Drawings & Specifications element is an evaluation of the development of Targets and Specifications as they are defined to be input to the design process (e.g. VDS/SDS/CDS), and to the Drawings (including all engineering drawings, CAD data, material specifications and engineering specifications.)

APQP Expectations for this element are described in the associated Quality-of-Event Checklist. The Checklist is used to plan for the element, and the Vehicle Program's FPDS milestone dates shall be understood and applied to the generically shown timing. This is done to make the Checklist specific for the supplier and the program.

Timing

Planning and execution of the Systems Engineering process is aligned with FPDS Milestones <SI> to <PA>. Planning and execution of the Drawings process is aligned with FPDS Milestones <PA> to <PR>.

Associated FPDS Process Sheets include (but are not limited to):

1.5.1.4.6	Update/Publish VDS Containing the Compatible Vehicle Targets
1.5.1.5.6	Publish SDS Containing the Compatible System Targets (Section 3)
1.5.1.6.6	Publish SS1DS Containing the Compatible Sub-system Level 1 Targets (Section 3)
1.5.1.7.6	Publish SS2DS Containing the Compatible Sub-system Level 2 Targets (Section 3)
1.5.1.8.5	Update/Publish CDS(s) Containing the Compatible End-Item/Component Targets (Section 3)
1.5.2.1.10	Integrate Manufacturing Equipment, Tools and Process Concepts, Capabilities and Constraints into System Targets

Linkage

Key APQP Elements that are input to "Drawings & Specifications" include (but are not limited to):

Customer Input
Team Feasibility Commitment
Design Failure Mode and Effects Analysis (DFMEA)
Design Verification Plan (DVP)

Drawings & Specifications – (cont.)

Key APQP Elements that "Drawings and Specifications" will provide output information to include (but are not limited to):

Design Failure Mode and Effects Analysis (DFMEA)
Facilities / Tools / Gauges
Manufacturing Process Flow
Operator Process Instructions (Process definitions)
Process Failure Mode and Effects Analysis (PFMEA)
Pre-Launch Control Plan
Measurement System Evaluation

12

Team Feasibility Commitment

Overview

Team Feasibility determines whether the proposed design can be manufactured within the guidelines and specifications. A cross-functional design/manufacturing review team is charged with assessing design feasibility. Once workability is established, the Program Organization undertakes the responsibility of following the design/manufacturing review process and reassessing feasibility for any design or part change that may occur during product development.

APQP Expectations for this element are described in the associated Quality-of-Event Checklist. The Checklist is used to plan for the element, and the Vehicle Program's FPDS milestone dates shall be understood and applied to the generically shown timing. This is done to make the Checklist specific for the supplier and the program.

Timing

Planning is aligned with FPDS Milestones <SI> to <CC>.

Associated FPDS Process Sheets include (but are not limited to):

- 1.5.2.2.1 Perform Product/Manufacturing Feasibility Studies
- 1.5.2.2.2 Perform Manufacturing Tooling/Machining Feasibility Study

Linkage

Key APQP Elements that are input to "Team Feasibility Commitment" include (but are not limited to):

- Customer Input
- Facilities / Tools / Gauges
- Design Failure Mode and Effects Analysis
- Measurement System Evaluation
- Manufacturing Process Flow
- Operator Process Instructions (Process definition)
- Process Failure Mode and Effects Analysis

Key APQP Elements that "Team Feasibility Commitment" will provide output information to include (but are not limited to):

- Facilities / Tools / Gauges
- Manufacturing Process Flow
- Measurement System Evaluation
- Drawings & Specifications

13

Manufacturing Process Flow

Overview

The Manufacturing Process Flow is a graphic representation of the current or proposed sequence of manufacturing process. The Manufacturing flow chart can be either in the traditional flow chart format, or depicted in Cycle Line Layouts, Tooling Line Layouts, Plant Layouts, or other appropriate types of layouts, providing all necessary information is included or attached.

The purpose of this element is to ensure that the process definition, PFMEA, and Control Plans can be created and analyzed in the appropriate sequence. It is also a visual confirmation that everyone involved from the suppliers, design and manufacturing engineering, and the manufacturing facility understand the proposed sequence of manufacturing.

APQP Expectations for this element are described in the associated Quality-of-Event Checklist. The Checklist is used to plan for the element, and the Vehicle Program's FPDS milestone dates shall be understood and applied to the generically shown timing. This is done to make the Checklist specific for the supplier and the program.

Timing

Planning is aligned with FPDS Milestones <SC> to (CP).

Associated FPDS Process Sheets include (but are not limited to):

1.5.2.3 Define Process Flow

Linkage

Key APQP Elements that are input to "Manufacturing Process Flow" include (but are not limited to):

Facilities / Tools / Gauges
Design Failure Mode and Effects Analysis (DFMEA)
Prototype Builds

Key APQP Elements that "Manufacturing Process Flow " will provide output information to include (but are not limited to):

Operator Process Instructions (Process definition)
Process Failure Mode and Effects Analysis (PFMEA)
Prototype Build Control Plan
Pre-Launch Control Plan

14

Process Failure Mode and Effects Analysis (PFMEA)

Overview

A Process FMEA is a systematic approach used by a manufacturing responsible team to assure that potential process related failure modes and their associated causes have been addressed and resolved.

The Manufacturing Process Flow diagrams are used as visual inputs to the PFMEA to ensure that the process is analyzed in the appropriate sequence, and that all failure modes are addressed. In addition, the potential Special Characteristics from the DFMEA process are a key input to the PFMEA. The PFMEA is used to help determine if those potential Characteristics will need to be monitored in production, or if there is a way to control them through the process.

APQP Expectations for this element are described in the associated Quality-of-Event Checklist. The Checklist is used to plan for the element, and the Vehicle Program's FPDS milestone timing dates shall be understood and applied to the generically shown timing. This is done to make the Checklist specific for the supplier and the program.

Timing

Planning is aligned with FPDS Milestones <SC> to (CP), with updates to <LR>.

Associated FPDS Process Sheets include (but are not limited to):

1.5.2.3.1	Perform Manufacturing Process Failure Mode Effect Analysis for New Product or Process Technology
1.5.2.3.2	Perform all Other Manufacturing Process Failure Mode Effect Analysis
1.5.2.3.5	Update all Mfg. Process Failure Mode Effect Analysis

Linkage

Key APQP Elements that are input to "Process Failure Mode and Effects Analysis (PFMEA)" include (but are not limited to):

Design Failure Mode and Effects Analysis (DFMEA)
Facilities / Tools / Gauges
Manufacturing Process Flow
Operator Process Instructions (Process definition)
Prototype Builds
Production Trial Run

Process Failure Mode and Effects Analysis (PFMEA) – (cont.)

Key APQP Elements that "Process Failure Mode and Effects Analysis (PFMEA)" will provide output information to include (but are not limited to):

Design Failure Mode and Effects Analysis (DFMEA)
Team Feasibility Commitment
Prototype Build Control Plan
Pre-Launch Control Plan
Operator Process Instructions (Process definition)

15

Measurement System Evaluation

Overview

The Measurement System Evaluation assesses the variation of the measurement system and determines whether the measurement system is acceptable for monitoring the process.

APQP Expectations for this element are described in the associated Quality-of-Event Checklist. The Checklist is used to plan for the element, and the Vehicle Program's FPDS milestone dates shall be understood and applied to the generically shown timing. This is done to make the Checklist specific for the supplier and the program.

Timing

Planning is aligned with FPDS Milestones <SC> to <CC>.

Associated FPDS Process Sheets include (but are not limited to):

2.2.4.5	Carry-over End-ItemDesign Quality Control Tools & Equipment
3.8.1.8	Build Quality Control Tools & Equipment
3.7.1.2.4.5	Try-out Quality Control Tools & Equipment
3.7.1.4.2	Perform Preliminary Process Capability Study (PPK) and Produce PSW Parts/Assemblies

Linkage

Key APQP Elements that are input to "Measurement System Evaluation" include (but are not limited to):

Team Feasibility Commitment
Drawings & Specifications
Facilities / Tools / Gauges

Key APQP Elements that "Measurement System Evaluation" will provide output information to include (but are not limited to):

Team Feasibility Commitment
Facilities / Tools / Gauges
Prototype Build Control Plan
Pre-Launch Control Plan
Production Control Plan
Preliminary Process Capability
Part Submission Warrant (PSW)

16

Pre-Launch Control Plan

Overview

The Pre-Launch Control Plan is a written description of the dimensional measurements and material and functional tests (in-process checks) that will occur after the Prototype Builds and before the Production Builds. The Pre-Launch Control Plan should include any additional necessary product/process controls until the production process is validated. Its purpose is to contain potential non-conformances after prototype, but prior to full production (e.g. 1PP and FEU Builds).

Examples of these types of checks include:

- Increased Inspection
- Increased Audits
- Increased Statistical Charting

APQP Expectations for this element are described in the associated Quality-of-Event Checklist. The Checklist is used to plan for the element, and the Vehicle Program's FPDS milestone dates shall be understood and applied to the generically shown timing. This is done to make the Checklist specific for the supplier and the program.

Timing

Planning is aligned with FPDS Milestones <PR> to <CC> with updates to <LR>.

Associated FPDS Process Sheets include (but are not limited to):

1.3.2.20.2 Develop Quality Control Plans for Pre-Launch Builds

Linkage

Key APQP Elements that are input to "Pre-Launch Control Plan" include (but are not limited to):

Process Failure Mode and Effects Analysis (PFMEA)
Prototype Build Control Plan
Prototype Builds
Measurement System Evaluation
Operator Process Instructions
Manufacturing Process Flow

Key APQP Elements that "Pre-Launch Control Plan" will provide information to include (but are not limited to):

Operator Process Instructions (Process verification, allocations, and training)
Production Trial Run
Production Control Plan

Operator Process Instructions

17

Overview

The Operator Process Instructions element is divided into two major components: The first being Process Description; and the second being Operator Instructions (e.g. operator allocations, verification of process definition, and operator training). Operator Process Instructions describe the details of controls and actions that operating personnel must perform to produce quality products.

APQP Expectations for this element are described in the associated Quality-of-Event Checklist. The Checklist is used to plan for the element, and the Vehicle Program's FPDS milestone dates shall be understood and applied to the generically shown timing. This is done to make the Checklist specific for the supplier and the program.

Timing

Planning of the Process Description is aligned with FPDS Milestones <SC> to (CP). Planning of the Operator Allocations and Training process is aligned with FPDS Milestones (CP) to <LS>, with updates to (J1) and beyond.

Associated FPDS Process Sheets include (but are not limited to):

1.5.2.3.3 Modify or Develop New Process Sheets
3.7.2.1.1.3 Verify Process Sheets during the Confirmation Prototype Build Phase

Linkage

Key APQP Elements that are input to "Operator Process Instructions" include (but are not limited to):

Design Failure Mode and Effects Analysis (DFMEA)
Facilities / Tools / Gauges
Manufacturing Process Flow
Prototype Builds
Pre-Launch Control Plan
Production Trial Run
Process Failure Mode and Effects Analysis (PFMEA)

Key APQP Elements that "Operator Process Instructions" will provide output information to include (but are not limited to):

Production Trial Run
Process Failure Mode and Effects Analysis (PFMEA)
Production Control Plan

18

Packaging Specifications

Overview

The supplier of a product must ensure that individual packaging for shipment (including interior partitions) is designed and developed. Customer packaging standards or generic packaging requirements should be used when appropriate.

APQP Expectations for this element are described in the associated Quality-of-Event Checklist. The Checklist is used to plan for the element, and the Vehicle Program's FPDS milestone dates shall be understood and applied to the generically shown timing. This is done to make the Checklist specific for the supplier and the program.

Timing

Planning is aligned with FPDS Milestones <SI> to <PA>. Engineering and testing of the Packaging is aligned with FPDS Milestones <PA> to <LS>.

Associated FPDS Process Sheets include (but are not limited to):

- 3.7.1.5 Validate Material Handling/Material Packaging

Linkage

Key APQP Elements that are input to "Packaging Specifications " include (but are not limited to):

Sourcing
Customer Input
Team Feasibility Commitment

Key APQP Elements that "Packaging Specifications" will provide output information to include (but are not limited to):

Prototype Builds
Production Trial Run

19

Production Trial Run

Overview

The Production Trial Run is a validation of the effectiveness of the manufacturing and assembly process, using production tooling, equipment, environment (including production operators), facilities and cycle times. Output of the Production Trial Run is used for Production Part Approval for the manufacturer, and "Open-To-Go" review for Assembly.

Part of the Production Trial Run process, consists of the Phased PPAP requirements. This process begins with an Initial Run-at-Rate, which should be performed from a single production stream (from a minimum of one production tool / line / process stream) at production feeds and speeds. The process is normally run for one to eight hours with a minimum of 300 pieces. It provides an early indicator to the intended production line yield requirement for that product stream, to support the latest authorized program volumes based on the RFQ (Request for Quote).

APQP Expectations for this element are described in the associated Quality-of-Event Checklist. The Checklist is used to plan for the element, and the Vehicle Program's FPDS milestone dates shall be understood and applied to the generically shown timing. This is done to make the Checklist specific for the supplier and the program.

(Please note that there are two different checklists for this element: Internal / External Suppliers, and the Assembly Process).

Timing

Planning for Internal / External Suppliers is aligned with FPDS Milestones <CP> to (J1).
Planning for the Assembly Process is aligned with FPDS Milestones <CC> to (J1).

Initial Run-at-Rate must be completed in time to support the subsequent completion of Quality Verification process (Phase 1).

Associated FPDS Process Sheets include (but are not limited to):

3.7.2.3	Validate Production Assembly via Production Prove-Out Build (1PP)
3.7.2.3.6	Tool Try-out/Production Prove-out Build (TTO/1PP)
3.7.2.4	Validate Production Assembly Process via Sales Build (Includes FEU Builds)
3.7.2.4.7	Build Continuous Sales Units

Production Trial Run – (cont.)

Linkage

Key APQP Elements that are input to "Production Trial Run " include (but are not limited to):

Pre-Launch Control Plans
Operator Process Instructions

Key APQP Elements that "Production Trial Run" will provide output information to include (but are not limited to):

Production Control Plan
Preliminary Process Capability
Process Failure Mode and Effects Analysis (PFMEA)
Design Failure Mode and Effects Analysis (DFMEA)
Production Validation Testing
Operator Process Instructions

20

Production Control Plan

Overview

The Production Control Plan is a written description of the systems for controlling parts and processes during full production. This document is based on the Pre-Launch Control Plan.

APQP Expectations for this element are described in the associated Quality-of-Event Checklist. The Checklist is used to plan for the element, and the Vehicle Program's FPDS milestone timing dates shall be understood and applied to the generically shown timing. This is done to make the Checklist specific for the supplier and the program.

(Please note that there are two different checklists for this element: Internal / External Suppliers, and the Assembly Process).

Timing

Planning for Internal / External Suppliers is aligned with FPDS Milestones (CP) to <LR>.
Planning for the Assembly Process is aligned with FPDS Milestones <LR> to (J1)+.

Associated FPDS Process Sheets include (but are not limited to):

1.3.2.20.3 Develop Quality Control Plans for On-Going Production

Linkage

Key APQP Elements that are input to "Production Control Plan " include (but are not limited to):

Pre-Launch Control Plans
Operator Process Instructions
Production Trial Run
Preliminary Process Capability
Measurement System Evaluation
Production Validation Testing

Key APQP Elements that "Production Control Plan" will provide output information to include (but are not limited to):

Operator Process Instructions
Customer Input

21

Preliminary Process Capability

Overview

The Preliminary Process Capability study is a statistical assessment of the ability of the process to produce product within specification. Refer to the AIAG Production Part Approval Process (PPAP) manual for more details concerning the Preliminary Process Capability study.

APQP Expectations for this element are described in the associated Quality-of-Event Checklist. The Checklist is used to plan for the element, and the Vehicle Program's FPDS milestone dates shall be understood and applied to the generically shown timing. This is done to make the Checklist specific for the supplier and the program.

Timing

Planning is aligned with FPDS Milestones (CP) to (J1).

Associated FPDS Process Sheets include (but are not limited to):

- 3.7.1.4.2 Perform Preliminary Process Capability Study (Ppk) and Produce PSW Parts/Assemblies

Linkage

Key APQP Elements that are input to "Preliminary Process Capability " include (but are not limited to):

Production Trial Run
Measurement System Evaluation

Key APQP Elements that "Preliminary Process Capability" will provide output information to include (but are not limited to):

Production Control Plan
Production Validation Testing
Part Submission Warrant (PSW)

22

Production Validation Testing

Overview

Production Validation Testing refers to engineering testing which validates that products made from production tools and processes meet engineering standards/specifications. All Internal and External Suppliers to Ford are to complete Production Validation Testing as a requirement of the Part Submission Warrant (PSW).

Part of the Production Validation Testing consists of the Phased PPAP process for Quality Verification (Phase 1). Parts are to be produced from a minimum of one production stream (tool / line / facilities / etc.). Suppliers shall use the parts from the Initial Run-at-Rate for Quality Verification of all dimensions, lab requirements and Engineering Specifications (less appearance approval, master sample and PSW).

APQP Expectations for this element are described in the associated Quality-of-Event Checklist. The Checklist is used to plan for the element, and the Vehicle Program's FPDS milestone dates shall be understood and applied to the generically shown timing. This is done to make the Checklist specific for the supplier and the program.

(Please note that there are two different checklists for this element: Internal / External Suppliers, and the Assembly Process).

Timing

Planning for Internal / External Suppliers is aligned with FPDS Milestones (CP) to <LR>.
Planning for the Assembly Process is aligned with FPDS Milestones <CC> to <LS>.

Quality Verification (Phase 1) must be completed in time to permit completion of Production Verification prior to the In Plant Date (IPD) for the 1PP Vehicle Build.

Associated FPDS Process Sheets include (but are not limited to):

3.7.2.3	Validate Production Assembly Process via Production Prove-out Build (1PP)
3.7.2.3.6	Tool Try-out/production Prove-out Build (TTO/1PP)
3.7.1.4.2	Produce PSW Parts/Assemblies
3.7.1.1	Re-certify Re-usable Tools, Equipment and Processes using Carry-over End-Item
3.7.2.3.3	Suppliers & Ford Confirm can Handle Line Speed

Production Validation Testing – (cont.)

Linkage

Key APQP Elements that are input to "Production Validation Testing" include (but are not limited to):

Preliminary Process Capability
Production Trial Run

Key APQP Elements that "Production Validation Testing" will provide output information to include (but are not limited to):

Part Submission Warrant (PSW)
Production Control Plans

23

Part Submission Warrant (PSW)

Overview

Production Part Approval Process is the documented verification that the Internal or External supplier meets all engineering design requirements and the process has the capability to meet these requirements during an actual production run. This is accomplished through the Phase 2 & 3 of the Phased PPAP Process.

Production Verification (Phase 2) is completed at this time, and is equivalent to meeting all of the AIAG PSW Requirements. The complete actual production stream (tool, line / facilities / personnel) intended for this specific program / launch is in place and operational. Dimensional, Lab, ES testing is complete from all tools, cavities, molds, production streams including appearance approval, master sample and PSW submission.

The final phase, Capacity Verification (Phase 3) is completed after parts are produced from the complete actual production stream (tooling / equipment / facilities / personnel) for all production streams, typically by four weeks prior to Job 1. This is to ensure the ability to meet or exceed Ford required volumes. Capacity Verification is demonstrated by yielding quality parts that meet a minimum of one day of Ford production (Daily Planning Volume) DPV.

Capacity Verification (CV) shall be performed over multiple shifts with intended standard operating pattern and schedule. These parts must have successfully completed Quality and Production Verification – Phases 1 and 2. Supplier must fill out the required CV documentation as determined by region / program.

APQP expectations for this element are described in the associated Quality-of-Event Checklist. The Checklist is used to plan for the element, and the Vehicle Program's FPDS milestone dates shall be understood and applied to the generically shown timing. This is done to make the Checklist specific for the supplier and the program.

Timing

Planning for Internal / External Suppliers is aligned with FPDS Milestones <PR> to <LR>, with requirements out to (J1)+.

Production Verification must be completed by the 1PP IPD date (prior to 1PP) to support program build event – as required for this launch (lead program or lead plant). Capacity Verification should be completed no later than four weeks prior to Job 1. For sequenced parts (e.g. ILVS), CV can be completed later than four weeks prior to Job 1, as approved by the authorized quality representative (STA for external suppliers) and as documented in the MS3 / CMMS3 /CMMS support plan.

Part Submission Warrant (PSW) – (cont.)

Associated FPDS Process Sheets include (but are not limited to):

3.7.1	Validate Components / End-Items for Part Submission Warrant (PSW)
3.7.1.4.2	Perform Preliminary Process Capability Study (Ppk) and Produce PSW Parts/Assemblies

Linkage

Key APQP Elements that are input to "PPAP/PSW " include (but are not limited to):

ALL 23 APQP Elements

Appendix Section

Appendix A: APQP Roles & Responsibilities

APQP LEAD/ SUPPORT RESPONSIBILITIES - RELATIONSHIP TABLE

	Element	Other (NON VO)	VO APQP (Europe)	Assembly Plant	Stamping Plant	VO Mfg. Engrg. Stamping, Body Construction, Paint & Final	New Model Program Engineering (*5)	Material Handling & Packaging Engineering	Advanced Manufacturing Pre-Program Engineering	Manufacturing Business Office
1	Sourcing Decision	L - Purchasing(*2)	Input/Particip.	Input/Particip.	Input/Particip.	Input/Concur	Input/Particip.	Input/Particip.	Participate	L VO(*2)
2	Customer Input Requirements	Lead - PD	Input/Particip.	Input/Particip.	Input/Particip.	Input/Concur	Input/Particip.	Input/Particip.	Input/Particip.	Participate
3	Craftsmanship	Lead - PD	Input/Particip.	Input/Particip.	Input/Particip.	Input/Particip.	Input/Particip.	No Role	Input/Particip.	No Role
4	Design FMEA	Lead - PD	Input/Particip.	Input/Review	Input/Review	Input/Concur	No Role	No Role	Input/Particip.	No Role
5	Design / Manufacturing Review(s)	Shared Lead - PD	Input/Particip.	Input/Particip.	Input/Particip.	Shared Lead	Input/Concur	Input/Concur	Participate	No Role
6	Design Verification Plan & Report	Lead - PD	Input/Review	Participate	Participate	Input/Concur	Input/Concur	No Role	No Role	No Role
7	Subcontractor APQP Status	Lead - STA (*3)	Review	Input/Particip.	Input/Particip.	Input/Particip.	No Role	No Role	No Role	No Role
8	Facilities, Tools, and Gages	No Role	Review	Input/Concur	Input/Concur	Lead	Input/Concur	Input/Particip.	Input/Particip.	Input/Particip.
9	Prototype Build Control Plan	Lead - PD	Input/Particip.	Input/Particip.	Input/Particip.	Input/Concur	Concur	No Role	No Role	No Role
10	Prototype Builds	Lead - PD	Participate	Participate	Participate	Input/Concur	"AP" Concur/"CP" Lead	Participate	No Role	Input/Particip.
11	Drawings and Specifications	Lead - PD	Review	Review/Concur	Review/Concur	Input/Review	Review	Input/Review	No Role	No Role
12	Team Feasibility Commitment	Shared Lead - PD	Participate	Input/Concur	Input/Concur	Shared Lead	Input/Concur	Input/Particip.	Input/Concur	Input/Concur
13	Manufacturing Process Flow Chart	No Role	Review	Input/Concur	Input/Concur	Lead	Participate	Input/Particip.	No Role	No Role
14	Process FMEA	Input/Particip. - PD	Input/Concur	Input/Particip.	Input/Concur	Lead	Review	Input/Particip.	No Role	No Role
15	Measurement Systems Evaluation	No Role	Review	Input/Particip.	Input/Particip.	Lead	No Role	No Role	No Role	No Role
16	Pre-Launch Control Plan	Input/Particip. - PD	Shared Lead	Shared Lead	Shared Lead	Shared Lead	Input/Particip.	No Role	No Role	No Role
17	Operator Process Instructions	No Role	Review	Input/Particip.	Input/Particip.	Lead (*4)	Review	No Role	No Role	No Role
18	Packaging Specifications	Input/Concur - STA	Review	Input/Concur	Input/Concur	Input/Particip.	No Role	Lead	No Role	No Role
19	Production Trial Run	Input/Particip. - PD	Participate	Lead	Lead	Input/Particip.	Input/Concur	Input/Particip.	No Role	No Role
20	Production Control Plan	No Role	Input/Concur	Lead	Lead	Input/Particip.	Input/Particip.	No Role	No Role	No Role
21	Preliminary Process Capability Stud	No Role	Review	Review	Shared Lead	Shared Lead	Input/Concur	No Role	No Role	No Role
22	Production Validation Testing	Lead - PD	Review	Input/Particip.	Input/Particip.	No Role	Input/Concur	No Role	No Role	No Role
23	Production Part Approval (PPAP) & Part Submission Warrant (PSW)	STA (*3)	Review	Lead VO(*1)	Lead VO(*1)	Input/Particip.	Input/Concur	No Role	No Role	No Role

KEY

PD = Product Development
Lead = responsible to deliver element
Co-lead = shares responsibility to deliver elem

*1 for Make Parts
*2 for Vehicle Assembly Sourcing
*3 For Buy Parts
*4 Engineering Responsible for Process Sheets; Plants Responsible for Operator Generated Instructions/Aids
*5 New Model Launch Process

PLEASE NOTE

This document depicts an example of a Ford Vehicle Operations / Product Development Team Relationship Table. It can be used as an example to derive other tables specific to each organizations' requirements.

Powertrain Roles and Responsibilities Matrix

	Responsibility to Drive Element to Completion					
	OTHER	**PD**	**ME**	**PLANT**	**STA****	**SUPPLIER**
1 Sourcing Decision	Lead (1) –Purchasing Lead (2) – Program Office	Support	Support	-	Support	-
2 Customer Input Requirement	-	Lead	Support	Support	Support	Support
3 Craftsmanship	-	Lead*	Support	Support	Support	Support
4 Design FMEA	-	Lead*	Support	-	Support	Support
5 Design Review(s)	-	Lead*	Support	Support	Support	Support
6 Design Verification Plan	-	Lead*	Support	-	Support	Support
7 Subcontractor APQP Status	-	Support	Support	Support	Lead (1)	Execute
8 Facilities, Tools and Gauges	-	Support	Lead (2)	Support	Lead (1)	Execute
9 Prototype Build Control Plan	-	Support	Lead (2)	-	Lead (1)	Execute
10 Prototype Build(s)	-	Lead (1)*	Lead (2)	Support	Support	Support
11 Drawings and Specifications	-	Lead*	Support	-	Support	Support
12 Team Feasibility Commitment	-	Support	Lead (2)	Support	Lead (1)	Execute
13 Manufacturing Process Flow Chart	-	Support	Lead (2)	Support	Lead (1)	Execute
14 Process FMEA	-	Support	Lead (2)	Support	Lead (1)	Execute
15 Measurement Systems Evaluation	-	Support	Lead (2)	Support	Lead (1)	Execute
16 Pre-Launch Control Plan	-	Support	Lead (2)	Support	Lead (1)	Execute
17 Operator Process Instructions	-	Support	Lead (2)	Support	Lead (1)	Execute
18 Packaging Specifications	Lead (1) – MP&L*	Support	Lead (2)	Support	Support	Support
19 Production Trial Run	-	Support	Lead (2)	Support	Lead (1)	Execute
20 Production Control Plan	-	Support	Lead (2)	Support	Lead (1)	Execute
21 Preliminary Process Capability Study	-	Support	Lead (2)	Support	Lead (1)	Execute
22 Production Validation Testing	-	Support	Lead (2)	Support	Lead (1)	Execute
23 Part Submission Warrant (PSW)	-	Support	Support	Lead (2)	Lead (1)	Execute

Key

(1) – External Suppliers
(2) – Internal Suppliers
* – Full Service Suppliers (FSS) take the Lead and Execute on these activities
** – Ford STA takes the lead in ensuring external supplier has a quality event for these APQP elements.

Powertrain Program Review Process
(PTPRP)

The Power Train Program Review Process (PTPRP) standard is used to manage and review Powertrain program status and supports FPDS. This standard defines:

- Power Train Program Review Process in support of the PQOS
- A series of Powertrain checkpoints and their relationship to FPDS
- The program review process used to monitor the status of the deliverables and the overall health of the program
- The means of communicating the status of the deliverables at each checkpoint from Component Program Module Team (CPMT) through a total Powertrain System Checkpoint Review
- Uniform reporting formats to communicate program status within the team structure

Note: The PTPRP standard is not intended to define the Powertrain Product Development Process.

The correlation of FPDS to PTPRP is as follows:

- **Kick Off; KO = Ckpt. 11**
- **Engineering Declaration; SI = Ckpt. 9**
- **Strategic Confirmation; SC = Ckpt. 8**
- **Program Approval; PA = Ckpt. 7**
- **Design Complete; PT = Ckpt. 6**
- **Final Release; PR = Ckpt. 5**
- **Confirmation Prototypes; CP = Ckpt. 4**
- **Change Cut-off; CC = Ckpt. 3**
- **Launch Readiness; LR = Ckpt. 2**
- **Job 1; J1 = Ckpt. 1**
- **Final Status FS = Ckpt. -1**

STA Roles & Responsibilities

External Supplier (typically the role of a Project Manager):

Responsible to:

- *Plan, cascade, and evaluate completion of the APQP elements with a focus on Quality of Event and sub-tier performance.*
- *Collect and consolidate APQP Assessments for supplier internal program status reviews, QOS reporting, and proactive concern resolution.*
- *Communicate, deliver APQP assessments, action items and resolution plans, in a timely manner, to STA and PMT/CPMT on "High-Impact commodities" and any other red or yellow assessments or upon request.*
- *Provide adequate support for all build events and facilitate quick resolution of issues that may arise.*

STA Program Engineer
Responsible to:

- ***Lead selection of high impact suppliers with input from program team.***
- ***Notify high impact suppliers and provide guidance on APQP Status reporting requirements.***
- ***Collect, verify and consolidate "High-Impact" and red/yellow assessments on external suppliers for the vehicle program.***
- ***Prepare, distribute, and communicate periodic APQP status and risk assessment reports.***
- ***Support Site Engineers, as needed, in signing-off PFMEA and Control Plans for Segment III and IV suppliers with Inverted Delta parts.***
- ***Support Site Engineers, as needed, in the disposition of PPAP packages for Segment III & IV suppliers with PPAP levels 2 through 5.***
- ***Coordinate all Launch Readiness Reviews and support Site Engineer, as needed, for Segment III & IV Suppliers.***
- ***Support program build events and facilitate resolution of supplier quality issues.***

STA Site Engineer

Responsible to:

- ***Support High Impact Supplier selection process.***
- ***Assist supplier in developing robust product quality and process control methods.***
- ***Review supplier APQP status per program schedule.***
- ***Update Program Engineer on APQP status for all High Impact Supplier and those with Red or Yellow status.***
- ***Assist Suppliers in establishing element action plans and resolution.***
- ***Sign-off on PFMEAs and Control Plans for Inverted Delta parts.***
- ***Perform Launch Readiness Reviews for all Suppliers as required.***
- ***Disposition PPAP packages for all supplier sites.***

STA Roles & Responsibilities (cont.)

1. Sourcing Decision

Organization	Activity
Powertrain Operations (PTO) STA	**Provides input and participates in the development of the suppliers list**
External Suppliers	**Complete deliverables as outlined in the APQP quality of event checksheets.** **Report status, identify issues, open APQP action items and their resolution plan in the APQP status reports submitted to Supplier Technical Assistance (STA) and PMT / CPMT on a timely basis.**
Supplier Technical Assistance (STA)	**Support program sourcing decision by providing input on historical supplier quality performance and lessons learned from previous and current launches when requested.**

2. Customer Input Requirements

Organization	Activity
PTO STA	**Provides input and participates in the vehicle design criteria and program requirements and supports the development of the Wants List**
Supplier Technical Assistance (STA)	**Program STA Engineer will provide APQP status reporting frequency, review schedule, and other program specific requirements.**
External Suppliers	**Collect all information needed from customer as outlined in the APQP quality of event checksheets.** **Report status; identify issues and open APQP action items; and their resolution plan in the APQP status reports submitted to Supplier Technical Assistance (STA) and PMT / CPMT on a timely basis.**

STA Roles & Responsibilities (cont.)

3. Craftsmanship

Organization	Activity
PTO STA	**Provides input and participates in the execution of the Craftsmanship targets**
Supplier Technical Assistance (STA)	**Support all craftsmanship targets development activities for High Impact Suppliers as needed.**
External Suppliers	**Understand and execute all craftsmanship targets for your parts and support all pertinent activities outlined in the APQP quality of event checksheets, report status, identify issues and open APQP action items and their resolution plan in the APQP status reports submitted to Supplier Technical Assistance (STA) on a timely basis.**

4. Design FMEA

Organization	Activity
PTO STA	**Provides input and supports the program team and P/T engineers to develop DFMEAs**
Supplier Technical Assistance (STA)	**Support DFMEA activities for High Impact Suppliers as needed.**
External Suppliers	**Complete deliverables as outlined in the APQP quality of event checksheets.** **Conduct regular reviews of DFMEA updates with customer engineering and reliability team as design changes occurs until final engineering sign-off.** **Report status; identify issues and open APQP action items; and their resolution plan in the APQP status reports submitted to Supplier Technical Assistance (STA) and PMT/CPMT on a timely basis.**

STA Roles & Responsibilities (cont.)

5. Design and Manufacturing Review(s)

Organization	Activity
PTO STA	**Provides input and concurs on the Design and Manufacturing Reviews**
Supplier Technical Assistance (STA)	**Support reviews as needed and facilitate resolution of High Impact Supplier issues.**
External Suppliers	**Complete deliverables as outlined in the APQP quality of event checksheets.** **Report key issues, open APQP action items and their resolution plan in the APQP status reports submitted to Supplier Technical Assistance (STA) and PMT / CPMT on a timely basis.**

6. Design Verification Plan & Report

Organization	Activity
PTO STA	**Works with program team and P/T engineers to review and confirm the DVP results and specification settings for the engine and powertrain significant/critical characteristics**
Supplier Technical Assistance (STA)	**Support development of DVP for High Impact Suppliers as needed.**
External Suppliers	**Deliver all expectations at program-designated timelines outlined in the quality of event checksheets and APQP implementation guidebook.** **Report status; identify issues and open APQP action items; and their resolution plan in the APQP status reports submitted to Supplier Technical Assistance (STA) and PMT / CPMT on a timely basis.**

STA Roles & Responsibilities (cont.)

7. Sub-Contractor APQP Status

Organization	Activity
Internal and External Suppliers	**Complete deliverables as outlined in the APQP quality of event checksheets.** **Report status, identify issues and open APQP action items and their resolution plan in the APQP status reports submitted to Supplier Technical Assistance (STA) and PMT / CPMT on a timely basis.**
Supplier Technical Assistance (STA)	**Review supplier sub-contractor plans of High Impact Suppliers for program risks and monitor resolution of issues if there are any.**

8. Facilities, Tools & Gauges

Organization	Activity
External Suppliers	**Complete deliverables as outlined in the APQP quality of event checksheets.** **Report status, identify issues and open APQP action items and their resolution plan in the APQP status reports submitted to Supplier Technical Assistance (STA) and PMT / CPMT on a timely basis.**
Supplier Technical Assistance (STA)	**Review High Impact Supplier tooling development for program risks, elevate issues to program team, and monitor resolution of issues if there are any.**
VO and All Other Internal Suppliers	**Prior to the Production Trial Run, all other VO internal suppliers provide input and participate in supporting:** • **The selection of the facilities** • **The delivery and installation of tools and gauges**

STA Roles & Responsibilities (cont.)

9. Prototype Build Control Plan

Organization	Activity
PTO STA	**Provides input and participates in identifying any additional significant/critical characteristics for the PBCP**
Supplier Technical Assistance (STA)	**Review, facilitate, and monitor resolution of issues for High Impact Suppliers as needed. STA sign-off required for all inverted delta parts.**
External Suppliers	**Deliver all expectations at program-designated timelines outlined in the quality of event checksheets and APQP implementation guidebook.** **Present final document for engineering and STA approval and sign-off for all inverted delta parts.** **Report status, identify issues and open APQP action items and their resolution plan in the APQP status reports submitted to Supplier Technical Assistance (STA) and PMT / CPMT on a timely basis.**

10. Prototype Build

Organization	Activity
PTO STA	**Commits to identify lessons learned for new products, processes, facilities, and tools throughout the Prototype Build Phase**
Supplier Technical Assistance (STA)	**Support prototype build events and facilitate resolution of supplier quality issues.**
External Suppliers	**Complete deliverables as outlined in the APQP quality of event checksheets.** **Support all prototype build activities and provide immediate response and prompt resolution when build issues arise.** **Report status; identify issues and open APQP action items; and their resolution plan in the APQP status reports submitted to Supplier Technical Assistance (STA) and PMT / CPMT on a timely basis.**

STA Roles & Responsibilities (cont.)

11. Drawings & Specifications

Organization	Activity
PTO STA	**Provides input and supports the program team and P/T engineers to develop drawings and specifications**
External Suppliers	**Complete deliverables as outlined in the APQP quality of event checksheets.** **Report status, identify issues and open APQP action items and their resolution plan in the APQP status reports submitted to Supplier Technical Assistance (STA) and PMT / CPMT on a timely basis.**
Supplier Technical Assistance (STA)	**Verify that drawings and specifications include enough detail to ensure customer satisfaction, fit and function. Assist in identifying SC/CC's for High Impact Suppliers as needed.**

12. Team Feasibility Commitment

Organization	Activity
PTO STA	**Takes an active role in reviewing its support functions' feasibility at each Design and Manufacturing Reviews up to <CC>, and works to resolve all feasibility issues relating to specifications set for significant, critical, and special characteristics.**
External Suppliers	**Complete deliverables as outlined in the APQP quality of event checksheets.** **Take an active role in presenting data and reviewing feasibility at each Design and Manufacturing Reviews up to <CC>, and work to resolve all feasibility issues relating to specifications set for significant, critical, and special characteristics.** **Report status; identify issues and open APQP action items; and their resolution plan in the APQP status reports submitted to Supplier Technical Assistance (STA) and PMT / CPMT on a timely basis.**
Supplier Technical Assistance (STA)	**Support reviews as needed, monitor risk and facilitate resolution of High Impact Supplier issues.**

STA Roles & Responsibilities (cont.)

13. Manufacturing Process Flow

Organization	Activity
Supplier Technical Assistance (STA)	**Conduct on-site reviews for High Impact Suppliers as needed.**
External Suppliers	**Complete deliverables as outlined in the APQP quality of event checksheets.** **Report status, identify issues and open APQP action items; and their resolution plan in the APQP status reports submitted to Supplier Technical Assistance (STA) and PMT / CPMT on a timely basis.**
VO and All Other Internal Suppliers	**Provide input and participate in preparing Manufacturing Process Flow Charts, if necessary**

14 Process FMEA

Organization	Activity
PTO STA	**Leads in determining the PFMEAs to be prepared, and ensuring their coordination and preparation with all affected cross-functional activities**
Supplier Technical Assistance (STA)	**Conduct on-site review for High Impact Suppliers as needed. STA sign-off required for all inverted delta parts.**
External Suppliers	**Complete deliverables as outlined in the APQP quality of event checksheets.** *Present final document for engineering and STA approval and sign-off for all inverted delta parts.* **Report status; identify issues and open APQP action items; and their resolution plan in the APQP status reports submitted to Supplier Technical Assistance (STA) and PMT / CPMT on a timely basis.**

STA Roles & Responsibilities (cont.)

15. Measurement System Evaluation

Organization	Activity
PTO STA	Supports the development of the Wants List and will support Measurement Systems Evaluation status, when required
Supplier Technical Assistance (STA)	Conduct on-site review for High Impact Suppliers as needed.
External Suppliers	Complete deliverables as outlined in the APQP quality of event checksheets. Report status; identify issues and open APQP action items; and their resolution plan in the APQP status reports submitted to Supplier Technical Assistance (STA) and PMT / CPMT on a timely basis.

16. Pre-Launch Control Plan

Organization	Activity
Supplier Technical Assistance (STA)	Conduct on-site review for High Impact Suppliers as needed. STA sign-off required for all inverted delta parts.
External Suppliers	Complete deliverables as outlined in the APQP quality of event checksheets. Present final document for engineering and STA approval and sign-off for all inverted delta parts. Report status; identify issues and open APQP action items; and their resolution plan in the APQP status reports submitted to Supplier Technical Assistance (STA) and PMT / CPMT on a timely basis.

17. Operator Process Instructions

Organization	Activity
External Suppliers	Complete deliverables as outlined in the APQP quality of event checksheets. Report status; identify issues and open APQP action items; and their resolution plan in the APQP status reports submitted to Supplier Technical Assistance (STA) and PMT / CPMT on a timely basis.
Supplier Technical Assistance (STA)	Conduct on-site review for High Impact Suppliers as needed.

STA Roles & Responsibilities (cont.)

18. Packaging Specifications

Organization	Activity
Supplier Technical Assistance (STA)	**Conduct on-site review for High Impact Suppliers as needed.**
External Suppliers	**Complete deliverables as outlined in the APQP quality of event checksheets.** **Ensure that all packaging trials and approvals are obtained prior to PPAP submission.** *Report status; identify issues and open APQP action items; and their resolution plan in the APQP status reports submitted to Supplier Technical Assistance (STA) and PMT / CPMT on a timely basis.*

19. Production Trial Run

Organization	Activity
Supplier Technical Assistance (STA)	**Conduct on-site run @ rate reviews at supplier manufacturing location as needed. Support assembly plant trial runs and facilitate resolution of supplier quality issues.**
Internal and External Suppliers	**Complete deliverables as outlined in the APQP quality of event checksheets.** **Report status; identify issues and open APQP action items; and their resolution plan in the APQP status reports submitted to Supplier Technical Assistance (STA) and PMT / CPMT on a timely basis.** **Support customer assembly plant production trial runs with adequate personnel and provide prompt response and assistance to resolve any build issues that arise.**

STA Roles & Responsibilities (cont.)

20. Production Control Plan

Organization	Activity
Supplier Technical Assistance (STA)	**Conduct on-site review as needed. STA sign-off required for all inverted delta parts.**
External Suppliers	**Complete deliverables as outlined in the APQP quality of event checksheets.** **Present final document to engineering and STA approval and sign-off for all inverted delta parts.** **Report status; identify issues and open APQP action items; and their resolution plan in the APQP status reports submitted to Supplier Technical Assistance (STA) and PMT / CPMT on a timely basis.**

21. Preliminary Process Capability

Organization	Activity
Supplier Technical Assistance (STA)	**Review and verify capability for full PSW approval.**
External Suppliers	**Complete deliverables as outlined in the APQP quality of event checksheets.** **Report status; identify issues and open APQP action items; and their resolution plan in the APQP status reports submitted to Supplier Technical Assistance (STA) and PMT / CPMT on a timely basis.**

22. Production Validation Testing

Organization	Activity
Supplier Technical Assistance (STA)	**Review and verify successful completion of tests for full PSW approval.**
External Suppliers	**Complete deliverables as outlined in the APQP quality of event checksheets.** **Report status; identify issues and open APQP action items; and their resolution plan in the APQP status reports submitted to Supplier Technical Assistance (STA) and PMT / CPMT on a timely basis.**

STA Roles & Responsibilities (cont.)

23. Part Submission Warrant (PSW)

Organization	Activity
Supplier Technical Assistance (STA)	**PSW sign-off approval authority for all PPAP submission levels 2 through 5.**
Internal Suppliers	**Provide the facilities to deliver PSW parts at IPD and support the program as necessary**
External Suppliers	**Coordinate PSW approval activities with STA to support program PSW and Assembly plant IPD timing requirements.** **Follow AIAG Production Parts Approval Process (PPAP) submission requirements along with Ford specific guidelines in preparing PPAP packages.** **Report status; identify issues and open APQP action items; and their resolution plan in the APQP status reports submitted to Supplier Technical Assistance (STA) and PMT / CPMT on a timely basis.**

Appendix B:
Related Forms

Please refer to the FPS Website for information regarding OEE:

http://www.fps.ford.com/FPSElements.html

Please refer to the APQP Website for APQP Status Report/Checklists/APQP Risk Assessment forms:

http://www.quality.ford.com/apqp/

APQP Element Rating Checklist

1. Sourcing Decision

Sourcing Decision is a formal customer commitment to work with all Internal & External Part Suppliers, Tooling Suppliers, and Facility Suppliers on the program. Suppliers, and their sub-suppl should be engaged as early as possible (e.g. by SC) to understand program timing and requirements Sourcing Decision should be made with appropriate Quality History & Customer Input Data.

	FPDS Timing		Due Dates														
Item	**Start**	**Target**	**Program Timing**	**Supplier Timing**	**Expectations**	**<SI>**	**<SC>**	**<PH>**	**<PA>**	**(ST)**	**<PR>**	**(CP)**	**<CC>**	**<LR>**	**<LS>**	**(J1)**
1.	**KO**	**---**	1999/07/13	1999/07/13	There are NO major Sourcing Decision issues/inhibitors, that will create an uncontainable risk now or in the foreseeable future.	**G**	**R**	**Y**	**G**							
2.	**KO**	**SI**	1999/07/26	N/A	Ensure that the Supplier's Quality History is factored into the Sourcing Decision for all Phases of the Sourcing Decision including Global Logistics concerns. (e.g. Supplier Improvement Metrics (SIM) database).	**G**										
3.	**KO**	**SI**	1999/07/26	N/A	Ensure that Ford Global Logistics is aware of all selected suppliers at the SI Milestone.	**G**										
4.	**KO**	**SC**	1999/10/28	1999/10/21	Complete and communicate the Sourcing Decisions to the Part, Tooling & Facility Suppliers/Sub-Suppliers by the SC Milestone.		**R**	**G**								
5.	**KO**	**SC**	1999/10/28	1999/10/28	Ensure that all appropriate Part, Tooling and Facilities Suppliers/Sub-Suppliers are on-board and involved with the Program Team early enough to understand all requirements including Craftsmanship targets.		**R**	**Y**	**G**							
6.	**KO**	**SC**	1999/10/28	N/A	Ensure that Assembly and Stamping Plants are aware of all selected Suppliers. (see APQP Element "Customer Input").		**Y**	**G**								
7.	**SI**	**PA**	1999/06/29	1999/06/29	The Early Sourcing Target Agreement (ESTA) and Reliability Statement of Work, Engineering Statement of Work, etc., have been signed by Purchasing, Product Development and the Supplier				**Y**							
Other																
Overall	**KO**	**PA**	1999/06/29	1999/06/29	**Team's Overall Rating of this Element (G/Y/R**	**G**	**R**	**Y**	**Y**							
						08/02/99	11/01/99	12/03/99	07/13/00	07/26/00	04/18/01	08/20/01	03/04/02	06/19/02	07/24/02	11/04/02

Instructions:

Consider status of Expectations and then enter Overall Rating for that milestone. Enter open issues/comments/risks & resolution plans below. Rate this element based on the Expectations that should be complete at the milestone (boxed areas). Future Expectations should be considered when developing a Plan for completion of this Element.If a particular "Expectations" item is not applicable, enter "N/A" in the Milestone/Team Event column. Additional lines have been left blank, and may be used by Teams to add additional Expectations. Actions/Tasks to satisfy an Expectation may need to be IN PROGRESS before they become due. g, for their own use in tracking progress/status if desired.

Item	**Ford**	**Supplier**	**Open**	**Close**	**Issues / Comments / Risks**	**Corrective Actions / Resolution Plan**
4	T. Jones	F. Smith	-	-	CCAR List - Item # 08	See CCAR list - Item 8
5	A. Name	H. Putt	-	-	AIMS Issues Number - 21835489	See AIMS Issues Number - 21835489
6	T. Jones	-	-	-	Reference an Equivalent Program Issues Deck	See Equivalent Program Issues Deck
7	K. Mann	H. Putt	1999/06/15	1999/08/12	Write Issue / Comments / Risks here	Write Corrective Actions / Resolution here

APQP Program Risk Evaluation Checklist

REVIEW DATE	MODEL YEAR
SUPPLIER	VEHICLE LINE
PART NUMBER	SUPPLIER CODE
PART NAME	

ITEM NO.	QUESTIONS	LEVELS OF CONCERN LOW (No)	HIGH (Yes)	COMMENTS
	DESIGN CATEGORY			
1	New Commodity for Selected Supplier?			
2	New Materials or Technology used?			
3	New/Different Application of a Carry-Over Part?			
4	New Design Concept?			
5	Are there Safety/Emissions/Noise Requirements? (New Targets)?			
6	Any Non-Ford Engineering Sites used (for design)?			
7	Will design need to be co-coordinated with Mating parts for Fit, Function or Appearance?			
8	Is it a new / changed vehicle application?			
9	Any Historic Quality/Warranty Issue?			
	MANUFACTURING CATEGORY			
10	New Manufacturing Facility?			
11	Is there a New Manufacturing Process?			
12	A Part or System With Historical Launch Problems?			
13	Non-Ford Manufacturing site and/or high risk supplier?			
14	Is New Production Equipment Required?			
15	Are Special Tools or Tooling Fixtures Required?			
16	Are Gages or Check Fixtures Required to Ensure Dimensional Integrity?			
17	Any Potential Handling or Shipping Issues?			
18	Will Parts Ever be Shipped From a Location Other Than the Primary Source? (i.e. Warehouse, Offshore, etc.)			
19	Will Returnable Dunnage be Required (new or modified)?			
20	Is there a Volume Capacity Increase?			

Note: For questions with a LOW risk assessment, an upfront evaluation will be done with the customer (Ford) to determine the level of APQP required.

Customer Concurrence to Risk Assessment: _____

Date Completed: _____

Supplier Assessment Team (names & titles): _____

_____

_____

_____

_____

Appendix C:
Glossary of Terms

Glossary of Terms

1PP Build
The First Production Prove-Out units built at the assembly plant approximately 4 Months Before Job #1 (MBJ1). Considered Pre-Launch units.

Change Cutoff <CC> *
An FPDS Milestone. By the <CC> milestone, preliminary Engineering Signoff is completed including: CP durability testing, with known changes from the CP containable for the 1PP build, the initial set of road tests are completed, the design is at Job #1 level with "no further design changes except 'No Builds'", engineering confidence that objectives will be met is declared, and the Management drive is complete. In addition, color/graining tooling is authorized. Supplier commits to support the 1PP build with PSW parts, and the decision to support lifetime runs, changeover tooling, etc., is required.

Component
The individual parts that are linked or integrated into a vehicle, system or subsystem.

Confirmation Prototype (CP) *
An FPDS Event. At the (CP) event, prototype parts and assembly tools / ergonomics / process sheets are "Make like production" (to the extent feasible). The first CP's are available for tuning and durability testing. Coordinate measuring machines (CMM) analysis is complete for all CP end-items and subassemblies. P/T makes commitment to support Production Validation (PV) with Part Submission Warrant (PSW) parts.

Control Plan
A written description of the system for controlling processes producing products for Ford. A Control Plan describes a producer's quality planning actions for a specific product or process. The Control Plan lists all process parameters and part characteristics that require specific quality planning actions. A Control Plan contains all applicable Critical and Significant Characteristics.

Critical Characteristic
Production requirements (dimensions, performance tests) or process parameters that can affect compliance with government regulations or safe vehicle/production function, and which require Special Controls, i.e. specific supplier, assembly, shipping or monitoring actions to be included on Control Plans.

Criticality
A relative measure of the combined influence of the consequences of a failure mode (Severity) and its frequency (Occurrence). The product of Severity times Occurrence.

Customer
The next operation, department, person or company, whether internal or external, that receives or purchases products or services.

Dynamic Control Planning (DCP)
A methodology that ensures that customer expectations in the form of product design requirements are understood, deployed and controlled in the manufacturing and assembly processes. A team approach is used for the step-wise understanding and control of manufacturing process and products.

Design Freeze
A point in time determined by the Program Management when the design must be completed to support a prototype test program. Changes following the frozen design are not accepted without agreement from the Program's Chief Engineer and Program Manager.

Element
Specific documents, tasks and disciplines which must be completed to support the customer's program.

Fault Tree Analysis
A deductive analytical technique that uses a graphical tree to show cause and effect relationships between a single undesired event (failure) and the various contributing causes.

Field Evaluation Units (FEU)
Pre-Launch units built at the assembly plant around 3.5 Months Before Job #1 (MBJ1).

Federal Motor Vehicle Safety Standards (FMVSS)
Government safety regulations applicable in the country of vehicle sale (FMVSS in USA, CMVSS in Canada, EC/ECE in Europe). (Ref. Procedure FAP03-177)

Ford Product Development System (FPDS)
The Process Definition, Deliverables, and Timing that was developed and is used by Ford Motor Company to develop/revise products. The timing for this process covers the Product Development cycle from Kick-off to Job #1.

Gantt Timing Chart
A bar chart used to describe timing of elements, events, and milestones in a visual manner.

Job #1 Achieved (J1) *
An FPDS Event. By the (J1) event, the integrated launch is complete. Initial operator training is complete, and is continued through ramp-up. In-process and final quality indicators meet program objectives. Powertrain Production Validation (PV) is complete in support of PTO plant's Job #1. Field Evaluation Unit (FEU) drive is complete. CAE models are correlated and the bookshelf is updated.

Kick-OFF (KO) *
An FPDS Milestone. (KO) is the beginning of the program and program specific work.

Launch Readiness <LR> *
An FPDS Milestone. By the <LR> milestone, Final Engineering Signoff (excluding Certification/Safety documentation) is completed including: Functional objectives met, final road tests completed, and formal Certification / homologation (except emissions) testing is completed. This is readiness to proceed to Tool Try-Out (TTO), 1PP and Job #1. Confirmation Prototype (CP), and Hard Tooled Functional Build (HTFB) issues are resolved. All production assembly tools have been functioned at the tool source or in homeline. Color / texture / gloss signoff is complete, and 100% PSW parts are available for the 1PP build.

Launch Signoff <LS> *
An FPDS Milestone. By the <LS> milestone, analytical models are correlated with Confirmation Prototype (CP) test results. Tool Try-Out (TTO) and the 1PP Build are complete. Assembly plant tools and process verification is complete including aids & fixtures. Ford Customer Product Audit (FCPA) targets are obtained. Manufacturing assessment of full production feasibility is determined.

Lessons Learned
Problems, mistakes, things gone wrong/right (TGR, TGW) learned from reviewing similar part data. Information is gathered from government regulations, safety information, in-plant manufacturing data, G8D's, ES test data, user plant data, warranty data, field data, service data, campaigns, recalls or other sources of information.

Mistake Proofing
Techniques that use simple and inexpensive devices to prevent errors before they occur or detect errors and defects that have occurred.

Overall Equipment Effectiveness (OEE)
A combined analysis (or estimate) of Equipment Availability, Performance Efficiency, and Quality Rate which is meant to be used as a tool to track machine improvement progress. Included in the analysis are Total Available Time, Planned Downtime, Unplanned Downtime, and Ideal Cycle Time.

Percent Indices which are Process Capable (PIPC)
The number of characteristics, which are process capable, divided by the total number of characteristics being checked, multiplied by 100.

Percent Inspection Points which Satisfy Tolerance (PIST)
PIST is the number of conforming inspection checks divided by the total number of checks made, times 100.

Phased PSW
A process associated with the Production Part Approval Process (PPAP), where the supplier demonstrates they can produce quality parts at the required volumes. It is a three-phased process that begins with Quality Verification (Phase 1) where parts are produced from a minimum of one production stream. Production Verification (Phase 2) occurs when the completed production stream is available and operational. Initial sample parts for PPAP are produced during this phase. Capacity Verification, (Phase 3) is the final phase where parts are produced from the complete production stream including all tooling, equipment, facilities and personnel. Capacity verification is demonstrated by yielding quality parts that meet minimum required capacity for one production day.

Poka-Yoke
A particular method of Mistake Proofing developed by the Japanese.

Product to Process Characteristic Linkages
A statistical relationship between product characteristics and key process characteristics. These relationships are found by using tools such as scatter plots and designed experiments.

Product Quality Timing Plan
A supplier initiated plan that supports all elements of the APQP process. This plan includes supplier tasks, assignments, events, and timing required to ensure that system, subsystem or component meets customer expectations.

Product Readiness <PR> *
An FPDS Milestone. By the <PR> milestone, there is a full vehicle analytical sign-off that all objectives can be met. The last Class I surfaces are verified and released for major formed parts. Final Math 1, 2, & 3 data is released. The launch plan is confirmed and issued. CAD files reflect Pre-(CP) verification changes, and the Data Control Model is signed off.

Program Approval <PA> *
An FPDS Milestone. By the <PA> milestone, themes are approved for interior and exterior appearance (all trim levels). All targets become objectives. Facilities and tooling investments are approved. Marketing is committed to net revenue, and initial ordering guide is available. Program Design Verification Plans (DVP's) and Failure Mode and Effects Analyses (FMEA's) are to be complete. Program Parts List (PPL) is complete. Powertrain cross-section design is complete with manufacturing sign-off, and the final prototype (AP/CP) plan is available.

Program Metrics Tracking and Trends
A supplier led team defines and monitors the status of key metrics used throughout the APQP process. Metrics may include cost, weight, quality targets, mean time to failure (MTTF), reliability growth curves, 8D status, CR/CR status and functional performance.

Program Need Date
The last possible date the elements can be completed and not adversely affect quality or timing of a program.

Proportions & Hardpoints <PH> *

An FPDS Milestone. By the <PH> milestone, proportions are to be frozen, and hardpoints are to be selected. The package for people and cargo is to be frozen. Hardpoints and structural joint designs are compatible with all program targets. Level 2 subsystem targets are committed, and appearance themes have been reviewed in market research (interior / exterior).

Prototype

An initial or original model from which subsequent copies are made or improved models are developed.

Significant Characteristic

Product, process, and test requirements which are important for customer satisfaction and for which Quality Planning actions must be addressed, in a Control Plan.

Special Characteristics

Product and process characteristics designated by the customer, including governmental regulatory and safety, and/or selected by the team through knowledge of the product and process.

Strategic Confirmation <SC> *

An FPDS Milestone. By the <SC> milestone, Vehicle / System / and Level 1 Subsystem targets are committed. Powertrain line-up is selected. Manufacturing assembly locations for each derivative are confirmed. All system / subsystem suppliers are selected, and should be part of the team. Long lead funding has gone to the Board of Directors, and an initial Attribute Prototype (AP) / Confirmation Prototype (CP) plan is available.

Strategic Intent <SI> *

An FPDS Milestone. By the <SI> milestone, Strategies for product, market, manufacturing, supply, design and reusability are confirmed. Major customer/corporate wants and regulatory requirements compliance plans are done. Compatible vehicle level target ranges and product assumptions are established consistent with Affordable Business Structure (ABS) - including Craftsmanship. Appearance Stakeholder Team commits to appearance image. New technologies are identified, P/T and vehicle architecture are implementation ready, and program logistics are confirmed for timing, workplan, resources, and facilities.

Subcontractor

Providers of materials, parts, or services to a supplier.

Subsystem

A major part of a system which itself has the characteristics of a system, usually consisting of several components.

Supplier

A provider of production materials, parts or service parts.

Surface Transfer (ST) *
An FPDS Event. By the (ST) event, approved themes are refined for craftsmanship execution (consistent with <PA> Objectives). Interior and exterior Class IA surfaces are transferred to engineering (+/- 0.5 mm), and the Phased Data Notification process is initiated.

System
A set of interdependent subsystems or parts linked to perform a specific function.

Things Gone Right (TGR)
Product attributes or characteristics that produce a positive reaction from customers.

Things Gone Wrong (TGW)
Product attributes or characteristics that produce a negative reaction from customers. TGW includes both components and correct component functions that do not meet customer expectations.

***** All FPDS Milestone/Event descriptions have been provided for your information. Any discrepancies between these descriptions, and those found in FPDS documentation after the publish date of this Glossary should be investigated, and the FPDS definition is to supersede this description.

Appendix D:
References and Websites

References & Web Sites

AIAG APQP
Automotive Industry Action Group - Advanced Product Quality Planning and Control Plan Reference Manual (Chrysler, Ford, General Motors)
Second Printing, February 1995
Ford Intranet:
http://www.eim1.ford.com/RightSite/ssi4_logged_in
External Internet:
http://www.aiag.org

AIAG MSA
Automotive Industry Action Group - Measurement System Analysis Reference Manual (Chrysler, Ford, General Motors)
Second Edition, February 1995
Ford Intranet:
http://www.eim1.ford.com/RightSite/ssi4_logged_in
External Internet:
http://www.aiag.org

AIAG PFMEA
Automotive Industry Action Group - Potential Failure Mode and Effects Analysis Reference Manual (Chrysler, Ford, General Motors)
Second Edition, February 1995
Ford Intranet:
http://www.eim1.ford.com/RightSite/ssi4_logged_in
External Internet:
http://www.aiag.org

AIAG PPAP
Automotive Industry Action Group - Production Part Approval Process (PPAP) (Chrysler, Ford, General Motors)
Third Edition, September 1999
Ford Intranet:
http://www.eim1.ford.com/RightSite/ssi4_logged_in
External Internet:
http://www.aiag.org

AIAG QS-9000
Automotive Industry Action Group - Quality Systems Requirements QS-9000 (Chrysler, Ford, General Motors)
Third Edition, January 1999
Ford Intranet:
http://www.eim1.ford.com/RightSite/ssi4_logged_in
External Internet:
http://www.aiag.org

AIAG SPC
Automotive Industry Action Group Statistical Process Control (SPC) (Chrysler, Ford, General Motors)
Second Edition, March, 1995
Ford Intranet:
http://www.eim1.ford.com/RightSite/ssi4_logged_in
External Internet:
http://www.aiag.org

AIAG Tooling & Equipment - Automotive Industry Action Group - Tooling & Equipment Supplement (Chrysler, Ford, General Motors)
Second Edition, June 1998
Ford Intranet:
http://www.eim1.ford.com/RightSite/ssi4_logged_in
External Internet:
http://www.aiag.org

APQP
Advanced Product Quality Planning - Resource Center
Ford Intranet:
http://www.quality.ford.com/apqp/

DCP
Dynamic Control Process - Powertrain
Ford Intranet:
http://www.ptoquality.ford.com/dcp/default.htm

FPDS
Ford Product Development System
Ford Intranet:
http://www.fpdsonline.ford.com/home/index.asp
External Internet:
https://web.fpds.ford.com/fpdsonline/

FPS
Ford Production System
Ford Intranet:
http://www.fps.ford.com/

FRG
Ford Reliability Guide
Ford Intranet:
http://www.quality.ford.com/cpar/howto/

FTEP
Ford Technical Education Program - Design Verification Plan & Process Verification (DVP & PV)
Ford Intranet:
http://www.fdi.ford.com/main.asp
Ford Training and Development Center:
http://www.etd.ford.com/

FTEP
Ford Technical Education Program - Experimental Design
Ford Intranet:
http://www.fdi.ford.com/main.asp
Ford Training and Development Center:
http://www.etd.ford.com/

FTEP
Ford Technical Education Program - Failure Mode and Effects Analysis
Ford Intranet:
http://www.fdi.ford.com/main.asp
Ford Training and Development Center:
http://www.etd.ford.com/

FTEP
Ford Technical Education Program - Process Control Methods
Ford Intranet:
http://www.fdi.ford.com/main.asp
Ford Training and Development Center:
http://www.etd.ford.com/

FTEP
Ford Technical Education Program - Reliability
Ford Intranet:
http://www.fdi.ford.com/main.asp
Ford Training and Development Center:
http://www.etd.ford.com/

FTEP
Ford Technical Education Program - Robustness: Parameter Design
Ford Intranet:
http://www.fdi.ford.com/main.asp
Ford Training and Development Center:
http://www.etd.ford.com/

FTEP
Ford Technical Education Program - Robustness: Tolerance Design
Ford Intranet:
http://www.fdi.ford.com/main.asp
Ford Training and Development Center:
http://www.etd.ford.com/

FTEP
Ford Technical Education Program - Systems Engineering Fundamentals
Ford Intranet:
http://www.fdi.ford.com/main.asp
Ford Training and Development Center:
http://www.etd.ford.com/

OEE
Overall Equipment Effectiveness
Ford Intranet:
http://www.fps.ford.com/FPSElements.html

Phased PPAP
Ford Intranet:
http://www.purchasing.ford.com/prch_sta_man/html/PhasedPPAP.htm

PTPRP
Powertrain Program Review Process
Ford Intranet:
http://www.ptprocess.ford.com/

RVT
Research & Vehicle Technology - AVT Knowledge Base
Ford Intranet:
http://www.ekb.ford.com/

STA
Supplier Technical Assistance Program - Ford Supplier Network
Ford Intranet:
http://eccas266.dearborn.ford.com:8050/servlet/page?_pageid=59,61&_dad=portal30&_schema=PORTAL30
External Internet:
https://fsn.ford.com/

APPENDIX E:
CHANGE INDEX

Appendix E: Change- Index

Guideline Page - Checklist	Change Description	Issue Level	Revision Date	Approved By
Title Page	Revised Web location addresses	3.1	2002/3/01	S. Brownell
Page 16	Removed Q1 probation - added Q1 revoked supplier under item 2	3.1	2002/3/01	S. Brownell
Page 19 – 20	Remove Tier 2 supplier time line. Revised FS timing from - 6 to –3 MBJ1	3.1	2002/3/01	S. Brownell
All Checklists	Check sheets revised from mm/dd/yy to yyyy/mm/dd	3.1	2002/3/01	S. Brownell
All Checklists	Check sheet shaded boxes replaced with highlighted boxes	3.1	2002/3/01	S. Brownell
Checklist – 3 (Craftsmanship)	Reordered and revised the following items: 1,2,4,5,6,8,10,11,13,15,17,18,22,27,29,30,32,33,34,39	3.1	2002/3/01	S. Brownell
Various	Updated FPDS Process Sheet numbers to 3.1.2 release	3.2	2003/8/01	R. Colquhoun
Pages 44,48,50	Added Phased PSW Requirements to Elements 19, 22 & 23	3.2	2003/8/01	R. Colquhoun
Checklist – 3 (Craftsmanship)	Numerous revisions	3.2	2003/8/01	A. Hill
Checklist – 4 (Design FMEA)	Revised item 6	3.2	2003/8/01	R. Colquhoun
Checklist – 19 (Supplier)	Added Phased PPAP requirements	3.2	2003/8/01	R. Colquhoun
Checklist – 22 (PVT Testing - Supplier)	Added Phased PPAP requirements	3.2	2003/8/01	R. Colquhoun
Checklist – 23 (PSW)	Added Phased PPAP requirements	3.2	2003/8/01	R. Colquhoun
Page 54	Revised R & R – Element 7, 16, 23	3.2	2003/8/01	R. Colquhoun
Page 55	New R & R Matrix	3.2	2003/8/01	R. Colquhoun
Page 71	Revised Risk Assessment Form	3.2	2003/8/01	R. Colquhoun
Page 73	Revised 1PP Definition	3.2	2003/8/01	R. Colquhoun
Page 74	Added FMVSS Definition	3.2	2003/8/01	R. Colquhoun
Page 76	Added Phased PPAP Definition	3.2	2003/8/01	R. Colquhoun
Page 80-83	Revised website locations, added Phased PPAP	3.2	2003/8/01	R. Colquhoun

Note: | Denotes area of change from previous release