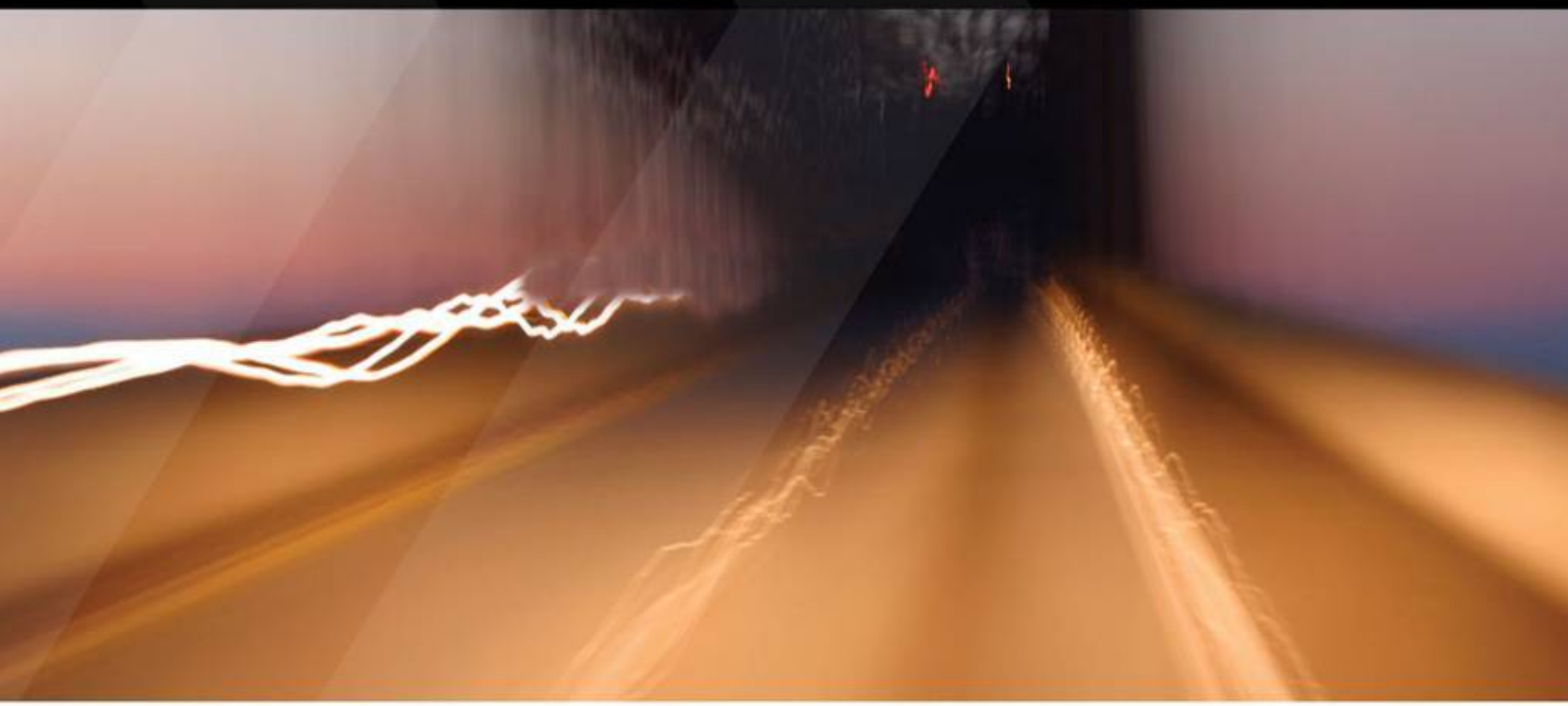
Supplier Quality Manual



Jacobs Vehicle Systems™

Revision: September 2009

I N D E X

1.0 Introduction

Jacobs Vehicle System (JVS) is committed to a process of continuously improving all aspects of our business, including the design, manufacturing and support of our products. This will ensure continued customer satisfaction and long-term competitiveness and growth of JVS and its suppliers. In addition, continuous improvement will increase productivity, reduce inspection and losses due to variation.

JVS does Advanced Product Quality Planning (APQP) and requires its suppliers to demonstrate process capabilities and develop and maintain process controls. For new part numbers and product/process changes, JVS works with suppliers to develop, approve and monitor processes using Design and Process FMEAs, Control Plans, Capability Studies, Gage R&R and other quality tools. The supplier's upper management must make a commitment to provide the required resources, time and training to effectively use these tools.

2.0 Quality System Requirements Specific to JVS

2.1 At a minimum, suppliers shall be certified to ISO 9001 Rev 2000 and comply with the AIAG PPAP requirements (4th Edition). However, ISO/TS16949 Certification is preferred and may be required of suppliers based on JVS and / or JVS customer requirements. This is a purchase order requirement and suppliers are responsible for purchasing and maintaining these industry standards. Supplier are required to notify JVS if they have a change to their Quality System Certification status and upon issuance of new registration certificates.

2.2 Additional Quality Systems Requirements specific to JVS are described in paragraphs 2.2.1 through 2.28.

2.2.1 Corrective Action

In the event of a quality issue related to a supplier's product, the supplier will be issued a Nonconforming Product Report (NPR). These will be designated based on the response requested by the supplier as:

- **For Notification Only**- This is for minor issues in which a formal response is not required from the supplier, but the supplier is responsible to insure containment and corrective action are taken.
- **Formal Corrective Action Required**- This requires the supplier to submit a formal corrective action response. 8D format is preferred. The following are requirements for response:
  -Initial Response (Acknowledgement of the issue and containment action taken) is required within 24 hrs.
  -Formal corrective action is required within 14 calendar days. JVS may require more frequent updates to corrective actions for some issues.

2.2.2 Change Management

Suppliers must notify JVS in advance of any intended product or process changes per the AIAG PPAP 4th edition section 3-Customer Notification and Submission Requirements, and receive JVS approval prior to implementation. Suppliers are to use the JVS Supplier Change Request Form (see appendix) to notify JVS of planned changes. Suppliers must also make this a requirement of their supply chain.

2.2.3 Nonconforming Material/Request for Deviation

Non-Conforming Product is defined as deviation from drawings, specification and purchase order requirements. On an exception basis, suppliers may submit a Request for Deviation for JVS to review and approval. Written approval is required prior to the shipment of any nonconforming products. A copy of the signed (approved) Supplier Request for Deviation (see appendix) shall accompany the shipment. The use of this form should be minimized as much as possible and shall not be construed as acceptance of future lots that do not meet specification.

2.2.4 Maintaining Process Control

The supplier shall maintain (or exceed) process capability or performance as approved via PPAP. To accomplish this, the supplier shall ensure that the Control Plan and Process Flow Diagram are implemented, including but not limited to, adherence to specified:

- Measurement technique
- Sampling plans based off of nationally or internationally known standards
- Acceptance criteria
- Reaction plans when the acceptance criteria is not met

2.2.5 Material Certificates of Analysis

For drawings that have material characteristics identified as critical or major, the supplier shall submit a Material Certification Analysis report with each shipment. The certification will have the part number, revision, quantity, purchase order number, specification numbers, signature and title of the authorized company representative and date. Note: Actual tests performed to verify material analysis may include material hardness, chemical composition, tensile strength, carbon / de-carbon, wedge test, thread lap, etc., depending on the drawing requirement.

2.2.6 Handling of Returnable Containers/ Dunnage

Suppliers shall provide for proper storage and maintenance of returnable containers. Suppliers are responsible for cleaning each container to ensure parts are free of debris prior to repackaging parts.

2.2.7 Inventory Management

Suppliers shall use an inventory management system to optimize inventory turns over time, assure stock rotation and minimize inventory levels.

2.2.8 JIT Delivery

JVS Production System works in a Just-In-Time (JIT) environment. Suppliers shall establish a system to support 100% on-time shipments to meet production and service requirements. Supplier shall communicate to JVS Buyer/Planner of potential late delivery problems in advance of the due date. When 100% on-time shipments are not maintained, the supplier shall (if requested by JVS) implement and submit a corrective action to improve delivery performance.

2.3 Documents to Accompany Shipment

2.3.1 Material Certificate of Analysis

For critical or major characteristic symbols noted next to the material requirements on the drawing, a material certification must accompany the shipment.

2.3.2 First Article Inspection Reports

Anytime a new First Article Inspection Report is performed, provide a copy of the report with the parts and attach to the outside of the shipping container a First Article Data Enclosed sticker that is provided by JVS. For kanban containers, put the sticker in a plastic sleeve or the inside top of the container.

2.3.3 Supplier Request for Deviation Forms

Provide a copy of the approved JVS Supplier Request for Deviation Report (see appendix) with the packing list for all affected shipments. Indicate on the packing list that the shipment has an approved form inside.

2.3.4 Lot Control Labels

As required, attach to the outside shipping container a Lot Control Change Notice sticker, when requested by JVS purchase orders. For kanban containers, put the sticker in the plastic sleeve or inside the top of the container.

3.0 Production Part Approval Process (PPAP)

3.1 PPAP Submission Requirements

JVS requires compliance to the PPAP submission requirements for the AIAG PPAP 4th Edition unless otherwise specified (Reference section 3 of the AIAG manual for when PPAP is required). The forms shown in the attachment section must be used for PPAP submission. The supplier is to complete and sign the Part Submission Warrant form and send it with submittal data to the JVS PPAP Coordinator jvsppap@jakebrake.com via e-mail in PDF format.

3.2 PPAP Submission Levels

PPAP submission level 3 is required unless otherwise specific by JVS (Reference AIAG PPAP manual section 4). Suppliers shall obtain a copy of the approved Part Submission Warrant prior to shipping production product to JVS.

3.3 Special Product Characteristic

JVS designates special product characteristics as critical or major. These characteristic symbols will be noted on JVS drawings for which variation outside of the tolerance could reasonably be expected to significantly affect product safety, customer satisfaction, fit, form and/or function.

Symbol	Characteristic type
●	**Critical Characteristics** are print specifications in which there is a demonstrated likelihood that variation outside the specification will have a significant impact such as loss of primary function. (ie engine failure). This classification should be considered for a characteristic that have a DFMEA severity ranking of 8 or higher.
◐	**Major Characteristics** are print specifications in which there is a demonstrated likelihood that variation outside the specification will have a significant impact on loss of secondary function (ie loss of engine braking performance.) Variation within the specification does not have an impact of primary function.

3.4 Key Control Characteristic (KCC)

KCC's are process parameters for which variation must be controlled to ensure the variation of the special product characterist is properly maintained at its target value. (Examples are tool profiles and machine settings.) Sources of KCC's are determined by the supplier, using the information from the completed DFMEAs and PFMEAs and related controlling features in the process. Key control parameters are selected by the supplier and are documented on the Process Control Plan.

3.5 Special Product Characteristic Capability Requirements

Characteristics that are designated as **Critical** must have one or more of the following that provides appropriate detection to insure product is made within print specifications:

- 100% inspection
- Poka Yoke
- Process Control limits with defined inspection frequency and reaction plan
- Long Term Cpk value of > 1.67

Characteristics that are designated as **Major** must have one or more of the following that provides appropriate detection to insure product is made within print specifications.

- Inspection frequency suitable to insure any non conforming product is detected and contained.
- Poka Yoke
- Process Control limits with defined inspection frequency and reaction plan
- Cpk value of > 1.33

4.0 Quality Requirements for Specific Commodities

4.1 Coil Springs Suppliers

At the time of the initial PPAP submission, suppliers are to submit fatigue test samples from three consecutive material heat numbers at least two weeks prior to scheduled deliveries.

During production, use one heat number for each JVS Purchase Order. Obtain tensile values for each of the coils from each heat number. Use the coil with the lowest acceptable tensile strength first. Stress Relieve and Shot Peen parts in sequence.

Final Inspect using a C=0 Sampling Plan (Indices are equivalent to AQLs):

- Index 1.0 for Critical / Major Characteristics and Key Control Characteristics
- Index 4.0 for other Minor Characteristics
- Submit with each initial heat number delivery, six samples from the lowest-tension coil for fatigue testing. All submissions send to" Attention: JVS Receiving Inspection".

4.2 Flat Spring Suppliers

During production, use one heat number for each JVS Purchase Order.

Final Inspect using a C=0 Sampling Plan (Indices are equivalent to AQLs):

- Index 1.0 for Critical / Major Characteristics and Key Control Characteristics
- Index 4.0 for other Minor Characteristics

4.3 Nameplate Suppliers

During production, suppliers are to submit completed proofs for approval. For Die and Pattern approval, submit a 5-piece sample and First Article Inspection for all dimensions.

4.4 Forging and Fastener Suppliers

When lot numbers change; attach a Lot Control Change Notice label to the outside of the shipping containers. For Kanban containers, put the label in a plastic sleeve or the inside top of the container.

Assign a unique number to each product lot. Maintain Traceability of the raw material heat or lot number; heat treat lot number, manufacturing lot number.

4.5 Casting Suppliers

Casting Suppliers must adhere to Engineering Specification 1152 E. Please contact JVS to obtain a copy of this specification.

4.6 Steel Suppliers

Adhere to JVS material specification for the appropriate grade of material. Please contact JVS to obtain a copy of this specification. Specifications are listed below:

Specification Number	Material
131877	AISI/SAE 8620 Steel
131878	AISI/SAE 11L44 Steel
131879/131879S	AISI/SAE 4140 Steel
131880	AISI/SAE 41L40 Steel
132185	AISI/SAE 1144 Steel
132186/132186S	AISI/SAE 1137 Steel
132187	AISI/SAE 4820 Steel
132192/132192S	AISI/SAE 52100 Steel
132391	AISI/SAE 12L14 Steel
138459	AISI/SAE 1018 Steel
138460	AISI/SAE 4130 Steel
139033	AISI/SAE E52100 Steel

5.0 Strategic Supplier Attributes

JVS prefers to have working relationships with suppliers that have the desired attributes we want instilled within their organizations. JVS Comprehensive Supplier Evaluation Report and the quarterly Supplier Report Card are the tools used to select suppliers and measure their performance to the following attributes. The strategic supplier attributes are:

1. The supplier must have an effective quality system (minimum of ISO 9001 registration and follow the AIAG PPAP(4th edition) requirements. TS16949 registration is requirement when required by Jacobs' end customers.
2. The supplier should have a Zero Defect culture with an emphasis on continual improvement.
3. The supplier must be able to work in a Just in Time environment and be shall be able to absorb indemnification costs due to poor quality and late delivery.
4. The supplier shall have competitive pricing and provide cost reductions on an annual basis.

5. The supplier should be responsive and flexible to JVS delivery and cost requirements and have the ability to meet unexpected demands.
6. The supplier's upper management has a commitment to all of the above items.

6.0 Supplier Performance Evaluation

6.1 Supplier Report Card

The supplier report card is the framework for measuring supplier performance in Quality, Delivery, and Cost and is sent to suppliers on a quarterly basis. The Supplier Report Card calculates an overall score and performance level. Each element has a weighted percentage to indicate those elements that are ranked from highest to lowest. Suppliers that achieve an overall level of "Excellent and "Good", will have preference of being awarded new business.

Suppliers that receive a rating of "Needs Improvement" or "Unacceptable" rating are required to submit an action plan to show in detail what actions are going to be taken to by the supplier to improve in the next quarter.

Scorecard:Quality The delivered quality of production parts.

Part Per Million (PPM) (Total pieces defective (returned, reworked, sorted, UAI) **/** Total pieces received) X 1Million. Total pieces defective will be counted as follows:

NPR's dispositioned:

- Use As Is- Estimate of defective product based on incoming inspection
- RTV- Entire lot will be counted unless the supplier notifies JVS within 7 working days the number of defective parts found in their 100% inspection of the product returned.
- Sort- If supplier sorts, or arranges for a third party to sort at JVS, the defective pieces found.
- Rework- Estimate of defective product based on incoming inspection.

PPM Defective:

Points	Rating %	PPM Defective
5	40	< 50
4		50 – 2,000
3		2,001 – 5,000
2		5,001 – 10,000
1		10,001 – 20,000
0		> 20,000

Percentage of lot's received without an NPR:

Points	Rating %	PPM Defective
5	40	100%
4		91%-99%
3		81%-90%
2		76%-80%
1		70%-75%
0		<70%

Problem Elimination: Incidence of poor corrective action responses or lack of response to on or more quarters of an action plan for a "needs improvement" or "unacceptable" report card score. NPR's that are overdue at the end of the JVS fiscal calendar month will also be included in this measure.

Points	Rating %	Incidences
5	20	0
4		1
3		2
1		3
1		4
0		5 or greater

Scorecard:Delivery The ability to deliver what we want, at the right time, in the right way.

- Delivery –. Adelivery is considered late if it is not received on the required due date with the correct quantities, as specified on the purchase order or kanban signal. If JVS has to expedite kanban parts from a supplier to prevent a possible line down situation, the delivery is considered late. Not adhering to the requirements of this supplier quality manual such as lack of packing list, improperly labeled boxes and missing material certifications will also count as a delivery instance

Points	Rating %	On Time Delivery
5	100	100%
4		91%-99%
3		81%-90%
2		76%-80%
1		70%-75%
0		<70%

Scorecard:Cost Reduction The level of cost reduction achieved over a rolling one year period of time.

- Cost - Total Cost Reduction from the supplier / Total $$ the Supplier Shipped. This is a sum of the previous twelve-months.

Points	Rating %	Total Cost Reduction
5	100	> or equal to 5%
4		1%-4%
3		Maintaining Cost
0		Price increase

6.2 Escalation Process

When nonconforming material is received from a supplier, the following escalation process may be used.

Escalation Level	Trigger	Action Required
A	Non conforming product is detected at Jacobs	NPR is issued to supplier. Corrective action response is required in the time frame listed in the JVS NPR process.
B	Issue is repeated within one quarter of initial nonconformance.	Supplier is notified by supplier quality they must present their revised . 8D in person at JVS due to fact that original corrective actions containment were not effective.
C	Issue is repeated two times by supplier within one quarter of initial nonconformance.	Shipments from supplier must be 100% sorted for the nonconforming defect and marked certified. Sort data will be submitted to supplier quality with each shipment. Supplier will remain on 100% inspection until the supplier has remained defect free for thirty days or other time period as defined by JVS depending upon frequency of supplier shipments. JVS Supplier Quality may request to conduct an onsite review of the corrective action with the supplier's management at the supplier 's location.

6.3 Supplied Part Certification Program

JVS has a certified dock to stock and reduced inspection program on a part by part basis. To be eligible for consideration, the supplied part must meet the 20 minimum consecutive shipments without any non-conformances to dimensional, visual and attribute requirements. The goal for all suppliers to JVS should be to have all supplied parts be part of this program.

6.4 Charge Back Policy

Violation:	Penalty:
More that one shipment shipped on the same day on separate bills Of lading.	Reversal of all freight charges
Failure to use designated carrier.	Reversal of all freight charges.
Failure to call for truckload routing.	Reversal of all freight charges.
Failure to provide carrier pricing documentation on pre-pay and add shipments.	Freight charges deducted from the invoice.
No purchase order number on cartons or packing list.	Administrative fee of $50.00
Failure to follow UPS routing instructions.	Administrative fee of $50.00
NPRs Designated as sort or RTV	$300.00 Debit per NPR
Nonconforming Product is sorted by JVS Personnel	$75.00 per hour/inpsector

Any questions should be directed to the Purchasing Representative at JVS.

7 Glossary of Commonly Used Acronyms

AIAG	Automotive Industry Action Group
APQP	Advanced Product Quality Planning
CEDAC	Cause & Effect Diagram with Addition of Cards
CSER	Comprehensive Supplier Evaluation Report
C_{pk}	Process Capability Index
C=0	Zero Defective Sampling Plan
DBS	Danaher Business System
FMEA	Failure Mode & Effects Analysis
JIT	Just In Time
JVS	Jacobs Vehicle Systems
KPC	Key Product Characteristic
KCC	Key Control Characteristic
Kanban	Signal or trigger to replenish product quantity
NPR	Nonconforming Product Report
PCP	Process Control Plan
PPAP	Production Part Approval Process
PPM	Parts Per Million
RFD	Request for Deviation
SPIP	Supplier Performance Improvement Plan
Six-Sigma	3.4 defects for every million opportunities
TPM	Total Productive Maintenance

8.0 Packaging and Shipping Requirements

8.1 General Instructions

When JVS is responsible for freight charges, only carriers listed on the approved list on www.jakebrake.com are to be used. Please contact your JVS purchasing representative with any questions.

- Consolidate all shipments that are to be shipped to one location on the same day. Create a master Bill of Lading that references multiple purchase orders.
- A packing list is mandatory and must be attached to one of the cartons in the shipment. The packing list must include JVS part number(s), lot number(s), and purchase order number(s). Carton's that contain packing lists must be marked on the outside.
- Each carton must show consignee address, name, part number, quantity, and purchase order number.
- Shipments on pallets must be clearly marked with the piece count on each pallet.

8.1.2 Bill of Lading

A bill of lading (two copies) with the following information must be provided to the carrier at time of pick-up:
Consignee's Name
All Purchase order numbers
Description of merchandise and NMFC number
Ship to address

If shipped collect--- **Bill To:** Jacobs Vehicle Systems
c/o Trendset, Inc.

PO Box 1208
Mauldin, SC 29662

8.1.3 Small Package Shipments

Ship packages within UPS size limitations having a total shipment weight of **125 pounds** or less to the address (es) indicated on our purchase order. To insure proper billing of freight charges, choose the **collect only** option when entering your UPS shipment. Use the account number **017-460.**

8.1.4 Shipments by Air/Ground Expedite

JVS must authorize all collect air shipments or expedited shipments. Air carrier and account information and authorization number can be obtained from the purchasing JVS representative. Authorization must be referenced on bill of lading.

8.2 LTL Carrier Routing

When JVS is responsible for freight charges, only carriers listed on the approved list on www.jakebrake.com are to be used. Please contact your JVS purchasing representative with any questions.

Jacobs Vehicle Systems™

PPAP Scope

Date:_____ **To: JVS Buyer/Planner**
Part Number:_____ **Name:**_____
Part Name:_____ **Supplier Name:**_____
Revision:_____ **Supplier Contact:**_____
Purchase Order No.:_____
Reason for PPAP Submission:_____
This Submission Includes:

□ 1. Design Record / JVS Print
□ 2. Engineering Change Documents
□ 3. Customer Engineering Approval
□ 4. Design FMEA
□ 5. Process Flow Diagrams
□ 6. Process FMEA
□ 7. Control Plan
□ 8. Measurement System Analysis
□ 9. Dimensional Layout
□ 10. Material, Performance Test Results
□ 11. Initial Process Study
□ 12. Qualified Lab Documentation
□ 13. Appearance Approval Report
□ 14. Sample Product
□ 15. Master Sample
□ 16. Checking Aids
□ 17. Records of Compliance
with Customer Specific Requirements
□ 18. Part Submission Warrant
□ 19. Bulk Material Checklist

Jacobs Vehicle Systems™ Part Submission Warrant

Part Name _____ Customer Part Number _____ Rev. _____ If applicable

Tool PO Number _____ Engineering Drawing Change Level _____ Dated _____

Additional Engineering Changes _____ Dated _____

Shown on Drawing Number _____ Purchase Order No. _____ Weight (kg) _____

Checking Aid Number _____ Engineering Change Level _____ Dated _____

ORGANIZATION MANUFACTURING INFORMATION

Organization Name and Code

Street Address

City State Zip

SUBMISSION INFORMATION

Customer Name/Division

Customer Contact

Application

Note: **Does this part contain any restricted or reportable substances?** ☐ Yes ☐ No

Are plastic parts identified with appropriate ISO marking codes? ☐ Yes ☐ No

REASON FOR SUBMISSION

- ☐ Initial submission
- ☐ Engineering Change(s)
- ☐ Tooling: Transfer, Replacement, Refurbishment, or Additional
- ☐ Correction of Discrepancy
- ☐ Tooling inactive > than 1 year
- ☐ Change to Optional Construction or Material
- ☐ Sub-Supplier or Material Source Change
- ☐ Change in Part Processing
- ☐ Parts produced at Additional Location
- ☐ Other - please specify _____

REQUESTED SUBMISSION LEVEL (Check one)

- ☐ Level 1 - Warrant only (and for designated appearance items, an Appearance Approval Report) submitted to customer.
- ☐ Level 2 - Warrant with product samples and limited supporting data submitted to customer.
- ☐ Level 3 - Warrant with product samples and complete supporting data submitted to customer.
- ☐ Level 4 - Warrant and other requirements as defined by customer.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
(check)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

- ☐ Level 5 - Warrant with product samples and complete supporting data reviewed at supplier's manufacturing location.

DECLARATION

I affirm that the samples represented by this warrant are representative of our parts and have been made to the applicable customer drawings and specifications and are made from specified materials on regular production tooling with no operations other than the regular production process. I also certify that documented evidence of such compliance is on file and available for review.

EXPLANATION/COMMENTS: _____

List Molds / Cavities / Production Processes _____

Organization Authorized Signature _____ Date _____

Print Name _____ Phone No. _____ Fax No. _____

Title _____ E-Mail _____

Jacobs Sign Off

PPAP Warrant Disposition: ☐ Approved ☐ Rejected ☐ Interim Approval

Comment: _____

Design Engineer _____ Date _____

Buyer/Planner _____ Date _____

Process/Quality Engineer _____ Date _____

Jacobs Vehicle Systems™ **Supplier Deviation Request**

Date: To: JVS Buyer/Planner

Part Number: Name:

Part Name: Supplier Name:

Revision: Supplier Contact:

Quantity Involved: Purchase Order No.:

Description of Deviation:

Reason for Deviation:

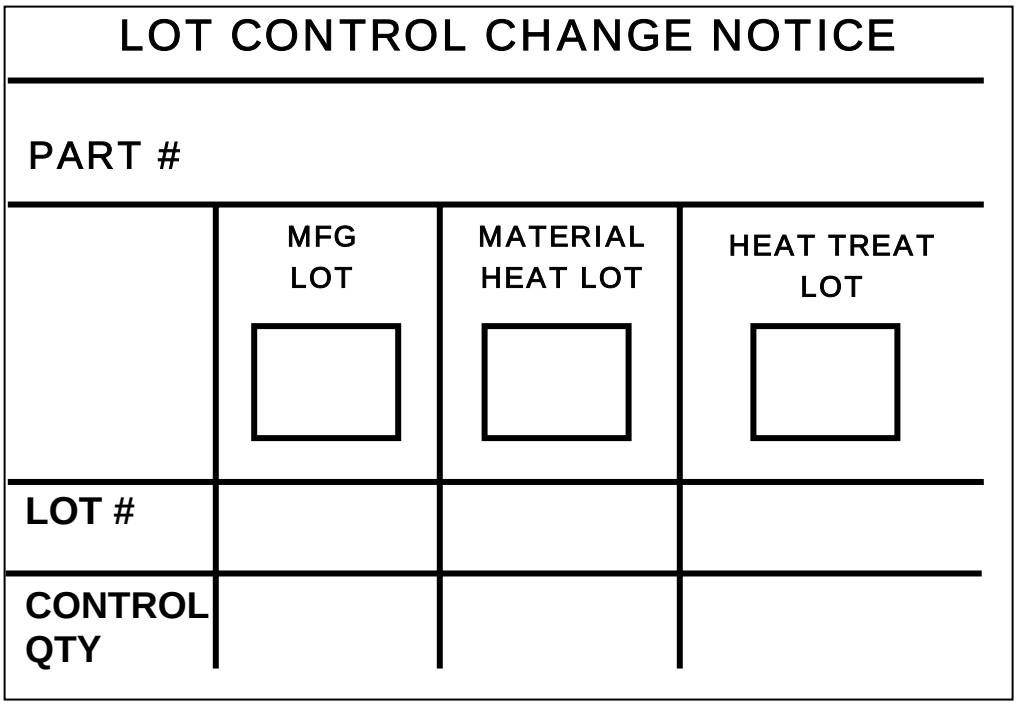
Corrective Action:

Request is: ☐ Accepted ☐ Rejected ☐ Modified

Reason for Rejection by Jacobs:

JVS Approvals		**Effectivity of Deviation**
Design Engineer	Date	P.O. No.
Purchasing	Date	Quantity Approved
Process Engineer	Date	DCN number

PRODUCT IDENTIFICATION LABELS



ATTENTION:
RECEIVING INSPECTION

FIRST ARTICLE DATA ENCLOSED

Jacobs Vehicle Systems™

FIRST ARTICLE INSPECTION REPORT

JACOBS VEHICLE SYSTEMS

Date:	Supplier:	Part Number:
Supplier Inspector:	Part Name:	P.O.:
Jacobs Inspector:	Date:	

Inspection Method: C=Calipers, DI=Drop Indicator, G=Gage Pins, I=Indicator, M=Micrometer, P=Profilometer, R=Rockwell Hardness Tester, S=Shadowgraph

		Supplier			Jacobs		
Item No.	Dimension	Method	Measurement	A/R	Method	Measurement	A/R

Jacobs Vehicle Systems™

Supplier Change Request

Date:	To: JVS Buyer/Planner
Part Number:	Name:
Part Name:	Supplier Name:
Revision:	Supplier Contact:
	Purchase Order No.:

Description of Change:

Reason for Change:

Proposed Time Frame for Implementation

PPAP Level Required:

Additional Requirements:

Request is: ☐ Accepted ☐ Rejected ☐ Modified

Reason for Rejection by Jacobs:

JVS Approvals

Design Engineer	Date
Purchasing	Date
Process Engineer	Date

Jacobs Vehicle Systems™

SUPPLIER PERFORMANCE IMPROVEMENT PLAN

Date:_____

Supplier Name: _____

Check the Improvement: Quality_____**Delivery**_____**Cost**_____**Support**_____**Support**_____

CSER_____

If Report Card: Quarter_____**Year**_____

Problem Description:
(System, Process, Capacility, Training, Productivity, Equipment)

_____

_____

_____

_____

Root Cause
(Use Problem Solving Tools)

_____

_____

_____

_____

Corrective Action
(Use Continuous Improvement Tools)

_____

_____

_____

_____

Date Change will be Implemented and Who Is Responsible for Implementation:
(Use a Gantt Chart to Plan Activities)

_____

_____

Supplier Signature and Date:

_____

Name & Title Date

Submit Performance Improvement Plan to JVS Manager, Supplier Development.