

SUPPLIER QUALITY MANUAL

2021



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1.0 Introduction

Jacobs Vehicle Systems (JVS) is committed to 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, and reduce inspection and losses due to variation.

JVS utilizes 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, Measurement Systems Analysis (MSA) and other quality tools. The supplier's upper management shall provide the required resources, time and training to effectively use these tools.

2.0 Quality System Requirements Specific to JVS

IATF16949:2016 Certification is preferred and may be required of suppliers based on JVS and / or JVS customer requirements. Certification to ISO 9001:2015 is now required for all suppliers. Suppliers shall comply with the AIAG PPAP requirements (4th Edition). Production suppliers who are not IATF16949:2016 certified shall provide JVS a gap analysis and plan to achieve IATF16949:2016 compliance prior to issuance of production purchase orders. The minimum requirements for IATF16949:2016 compliance, MAQMSR, can be found at the IATF website (Minimum Automotive Quality Management System Requirements for Sub-Tier Suppliers):

<http://www.iatfglobaloversight.org/wp/wp-content/uploads/2016/12/Minimum-Automotive-Quality-Management-System-Requirements-for-Sub-tier-suppliers-2ndEd-rev2.pdf>

This is a purchase order requirement and suppliers are responsible for purchasing and maintaining these industry standards. Suppliers are required to notify JVS of any change to their Quality System Certification status and upon issuance of new registration certificates.

2.1 ISO 14001:2015 Compliance Requirements

JVS prefers all suppliers be certified to ISO 14001:2015. At a minimum, each supplier shall demonstrate that an effective Environmental, Health, and Safety program is in place.

2.2 JVS General Quality Requirements

Additional Quality Systems Requirements specific to JVS are described in paragraphs 2.2.1 through 2.2.11.

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) which utilizes an eight disciplines (8D) format.

- The supplier shall submit a formal corrective action response to JVS Supplier Quality, unless otherwise specified. The 8D format is required; however, a supplier may use an internal format if the elements of the 8D are addressed. The supplier shall respond to the complaint per the following: Initial response is required within 24 hrs. (Acknowledgement of the issue and containment action taken)
 - The supplier shall validate the effectiveness of their current process controls and/or the quality of their inventory as it pertains to the complaint until parts are received for analysis.
 - JVS will require subsequent shipments of material to be 100% certified for a minimum of 3 shipments or as agreed with JVS supplier quality. All containers must be labeled "100% Certified per NPR#XXXXX".
- Formal corrective action plan is required within 14 calendar days. JVS may require more frequent updates to corrective actions for some issues.
- The goal for JVS Suppliers is to close NPR's within 30 days.
- JVS considers an NPR to be overdue after 30 days from initial communication or if the date(s) in the formal corrective action plan are past due.
- JVS will impose a fine of at least \$500 if there is a lack of responsiveness to the complaint. JVS will notify the Quality contact at the supplier of the fine referencing the NPR number.

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 shall use the JVS Supplier Change Request Form (available at <https://www.jacobsvehiclesystems.com/suppliers>) to notify JVS of planned changes. Suppliers shall 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 (available at <https://www.jacobsvehiclesystems.com/suppliers>) for JVS 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 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 requirements as approved via PPAP. To accomplish this, the supplier shall ensure that the Control Plan is effectively implemented, including, but not limited to, adherence to specified:

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

2.2.5 Material Certificates of Analysis

The supplier shall maintain Material or Coating Certifications for each shipment. These certifications shall be maintained for a period of five years from the date of shipment to JVS. The certification will have the part number, revision, quantity, purchase order number, specification numbers, signature and title of the authorized company representative and date. 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. JVS requests for Material or Coating Certifications shall be submitted within 24 hours.

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. JVS shall be notified of any dunnage issues.

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. On-time is defined as five days prior to the target date to three days after the target date. Suppliers shall communicate to the JVS Buyer/Planner of potential late delivery problems in advance of the due date. The supplier shall maintain a record of expedited shipments to JVS for issues pertaining to internal processing at the Supplier. These records shall be submitted to JVS Supplier Quality on a Quarterly basis.

2.2.9 CQI Special Process Initiative

The goal of the AIAG Special Process Initiative is the reduction of quality escapes, spills, recalls and warranty claims related to components from “Special Processes.” The Special Process Initiative is comprised of individual work groups that develop assessments based on best practices and designed to provide a means of continual improvement, emphasizing defect prevention and reduction of variation and waste in the supply chain. JVS requires a CQI assessment from all suppliers employing relevant special processes updated on a yearly basis, including sub-tier suppliers. Details on Special Process Assessments can be found on the AIAG website: <https://go.aiag.org/special-process-assessments>.

The applicable CQI's are:

- CQI-9: Heat Treat
- CQI-11: Plating
- CQI-12: Coating
- CQI-15: Welding
- CQI-17: Soldering
- CQI-23: Molding
- CQI-27: Casting
- CQI 29: Brazing

2.2.10 Risk Mitigation Process

It is expected that suppliers use any risk mitigation process available, however it is preferred that, to mitigate process risk, suppliers use the Failure Mode Effect Analysis (FMEA) to the AIAG 4th edition. The transition to the new AIAG & VDA FMEA Handbook (released June 2019) will be required by 2023.

2.2.11 Supplier and sub-tier requirements

The Supplier shall convey all applicable statutory and regulatory requirements and any special product or process characteristics (3.5) to their sub-tier suppliers and cascade these requirements to the point of manufacture (IATF 8.4.3.1). See also Clause 3 of JVS' Purchase Order Terms and Conditions for additional details of this requirement.

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). PPAP parts are to be clearly identified on the outside of the shipping container. All PPAP's shall include appropriate IMDS #s and date of acceptance.

JVS requires PPAP documentation to be submitted in PDF format. The following file naming convention applies:

3.1.1 PPAP file naming convention

- JVS Part Number
- Revision level
- PPAP element
- Example: 00-012345C_ControlPlan.pdf

3.1.2 JVS PPAP Workbook



The JVS PPAP workbook is located on the Supplier page of the JVS website: <https://www.jacobsvehiclesystems.com/suppliers>

3.2 PPAP Submission Levels

PPAP submission Level 3 is required unless otherwise specified by JVS (Reference AIAG PPAP manual section 4 and the PPAP workbook). Suppliers shall obtain a copy of the approved Part Submission Warrant prior to shipping production product to JVS. JVS will request a Level 4 PPAP for any part which has been in serial production with no changes for three years.

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 will affect either one or all of the following: 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 (i.e. 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 (i.e. loss of engine braking performance.) Variation within the specification does not have an impact of primary function.

3.4 Key Control Characteristic (KCC)

KCCs are process parameters for which variation must be controlled to ensure the variation of the special product characteristic 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 DFMEA's and PFMEA's 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 ensure product is made within print specifications:

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

Characteristics that are designated as **Major** must have one or more of the following that provides appropriate detection to ensure 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
- Demonstrated Cpk value of > 1.33

4.0 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:

- IATF16949:2016 Certification is preferred and may be required of suppliers based on JVS and / or JVS customer requirements. At a minimum, suppliers shall be certified to ISO 9001:2015 and comply with the AIAG PPAP requirements (4th Edition). New production suppliers who are not IATF16949:2016 certified shall provide JVS a gap analysis and plan to achieve IATF16949:2016 compliance prior to issuance of production purchase orders.
- ISO 14001:2015 Certification is preferred and may be required of certain suppliers based on JVS and / or JVS customer requirements.
- The supplier should have a Zero-Defect culture with an emphasis on continual improvement and effective problem solving.
- 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.
- The supplier shall have competitive pricing and provide cost reductions on an annual basis.
- The supplier should be responsive and flexible to JVS delivery and cost requirements.

5.0 Supplier Performance Evaluation

5.1 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” or “Good” will have preference of being awarded new business.

Suppliers that receive a rating of “Needs Improvement” or “Unacceptable” rating may be 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.

5.1.1 Quality

The Quality score is comprised of 60% weighting based upon PPM and by 40% weighting based upon responsiveness of corrective actions to NPR’s.

$$\text{PPM} = 1,000,000 \times \frac{\text{Total pcs defective}}{\text{Total pcs received}}$$

Total pieces defective will be counted as follows:

NPR’s dispositioned

- Use As-Is – Product deemed as acceptable (does not count as defective)
- 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 (60% Weighting):

Score	PPM Defective
5	≤ 10
4	11 – 50
3	51-400
2	401-1100
1	1101-2000
0	> 2000

Problem Elimination (40% Weighting)

The number of incidences of overdue NPR's or corrective action plan response past due for one or more quarters.

Score	Incidences of Overdue NPR's
5	0
4	1
3	2
2	3
1	4
0	5 or greater

**The Quality element score is calculated per the following formula:
 Quality Score = 60% * PPM Score + 40% * Problem Elimination Score**

5.1.2 Delivery

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

A delivery is considered on-time if it is received by the required due date with the correct quantities, as specified on the purchase order or Kanban signal. If JVS must 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 will also count as a delivery instance.

Score	On-Time Delivery
5	100%
4	95% – 99%
3	90% – 94%
2	80% – 89%
1	70% – 79%
0	< 70%

5.1.3 Cost Reduction

The level of cost reduction achieved over a rolling one-year period of time.

$$\text{Cost Reduction} = 1 - \frac{\text{Total (3 month) actual supplier invoiced price}}{\text{Total (3 month) frozen Standard Cost from prior yr}}$$

Score	Total Cost Reduction
5	≥ to 5%
4	1% – 4%
3	Maintaining Cost
0	Price Increase

5.1.4 Line Disruptions

A line disruption is considered any disruption to a Customer of JVS where the Customer reports a stop ship or stoppage in their production line as a result of a safety, quality or delivery issue with a JVS Supplier's part.

Score	Line Disruptions
No deduction	0
2-point deduction to overall score	≥ to 1

5.1.5 Premium Freight

Premium freight is considered any supplier delivery that is shipped via an expedited method outside of the normal production shipment method, unless dictated by JVS.

The Supplier is responsible to track and inform JVS of premium freight on a monthly basis.

Premium freight will be monitored and reported by number of occurrences and is currently not factored into the overall score.

The overall Supplier Quality Score is calculated per the following formula:

$$\text{Overall Score} = (40\% * \text{Quality} + 30\% * \text{Delivery} + 30\% * \text{Cost}) - \text{Line disruptions}$$

5.2 Supplier Development

Supplier development/improvement activities may include:

Overall Score	Supplier Quality Level	Supplier Development Activity
4.50 – 5.00	Excellent Isolated quality or delivery issue	<ul style="list-style-type: none"> • No formal development required beyond review of NPR corrective actions
4.00 – 4.49	Good Singular large quantity quality issue or some OTD issues	<ul style="list-style-type: none"> • No formal development required beyond review of NPR corrective actions
3.50 – 3.99	Fair Periodic quality or delivery issues	<ul style="list-style-type: none"> • Review of NPR corrective actions • Regular supplier conference calls with activity summary issue tracking • Consideration for on-site supplier process audit on “problem” part(s)
2.60 – 3.49	Needs Improvement Frequent quality or delivery issues	<ul style="list-style-type: none"> • Same Activities as Fair Level along with: <ul style="list-style-type: none"> ○ High consideration for on-site supplier process audit on “problem” part(s) ○ Potential candidate for Supplier Top Focus
< 2.60	Unacceptable Chronic quality or delivery issues	<ul style="list-style-type: none"> • Same Activities as Needs Improvement along with: <ul style="list-style-type: none"> ○ High consideration for on-site supplier process audit on “problem” part(s) ○ High consideration as candidate for Supplier Top Focus ○ Formal Corrective Action plan may be required ○ Consideration for resourcing, if issues are recurring

5.3 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 generally meet 10 minimum consecutive shipments without any non-conformances to dimensional, visual and attribute requirements. The exact number of lots depends on overall supplier performance, the severity of the non-conformance, and effectiveness of submitted corrective actions. The goal for all suppliers to JVS should be to have all supplied parts be part of this program.

5.4 Charge Back Policy

Violation	Penalty
More than 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
Unauthorized Premium Freight	Reversal of all freight charges
Not referencing premium freight Authorization # on bill of lading or waybill	Administrative fee of \$50.00
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
NPR's, as designated by JVS Supplier Quality	\$500 Debit per NPR
Nonconforming Product sorting, managed	\$30.00 per hour / inspector by JVS

Any questions should be directed to the JVS Purchasing Representative.



6.0 Glossary of Commonly Used Acronyms

8D	Eight Disciplines of Problem Solving
ABS	Altra Business System
AIAG	Automotive Industry Action Group
APQP	Advanced Product Quality Planning
CSER	Comprehensive Supplier Evaluation Report
CpK	Process Capability Index
C=0	Zero Defective Sampling Plan
DFMEA	Design 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
LTL	Less than Truck Load
MSA	Measurement Systems Analysis
NPR	Nonconforming Product Report, (8D)
PCP	Process Control Plan
PFMEA	Process Failure Mode & Effects Analysis
PPAP	Production Part Approval Process
PPM	Parts Per Million
RFD	Request for Deviation
RTV	Return to Vendor
SCR	Supplier Change Request
Six-Sigma	3.4 defects per million opportunities
TPM	Total Productive Maintenance
T's & C's	JVS Purchase Order Terms and Conditions
VDA	Verband der Automobilindustrie, German Automobile Association

7.0 Packaging and Shipping Requirements

7.1 Packaging Requirements

Packaging plans are included in the Supplier Feasibility review process and are approved during the PPAP process. Suppliers shall comply with the approved packaging methods, unless specifically approved for deviation by JVS.

7.1.1 Box Weight

Individual box quantities shall weigh less than 25 pounds, unless specifically approved otherwise by JVS during the supplier feasibility and PPAP approval process.

7.1.2 Sealing and securing

For safety reasons, the use of box staples and metal banding for skids or boxes is prohibited.

7.1.3 Labeling

Suppliers shall label all containers per AIAG standard B-10, to include PO#, Serial/Lot #, part# and qty.

PART NO. (P) 2260150777 D-ITEM 	
QUANTITY (Q) 2240 	DESCRIPTION 9V DC MOTOR MFG. DATE (D) 07-04-28 EXP. DATE 07-05-28 
SUPPLIER (V) 910275 	P. O. NO. (K) RB99997 
SERIAL (S) 12345 	REVISION (ZP) 4 

7.2 Shipping Instructions

7.2.1 Small Package Shipments

Ship packages via UPS Ground within UPS size limitations having a total shipment weight of **150 pounds** or less to the address indicated on the JVS purchase order. Individual boxes shall weigh less than 25 pounds, or as approved by JVS. To ensure proper billing of freight charges, choose collect (authorized ground accounts).

7.2.2 LTL Shipments

When JVS is responsible for freight charges, the supplier **must** use carriers listed on the Jacobs LTL Routing Guide available at <http://www.jacobsvehiclesystems.com/suppliers/jacobs-ltl-routing-guide/>. 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.

7.2.3 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.

7.2.4 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](#)