# PACCAR Supplier Quality Requirements Manual

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<table>
<thead>
<tr>
<th>PACCAR Production Site</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>DAF Eindhoven</td>
<td>Netherlands</td>
</tr>
<tr>
<td>DAF Westerlo</td>
<td>Belgium</td>
</tr>
<tr>
<td>Leyland</td>
<td>UK</td>
</tr>
<tr>
<td>DAF Caminhões Brasil</td>
<td>Brasil</td>
</tr>
<tr>
<td>Columbus Engine Plant</td>
<td>USA</td>
</tr>
<tr>
<td>Ste. Therese</td>
<td>Canada</td>
</tr>
<tr>
<td>Chillicothe</td>
<td>USA</td>
</tr>
<tr>
<td>Renton</td>
<td>USA</td>
</tr>
<tr>
<td>KenMex</td>
<td>Mexico</td>
</tr>
<tr>
<td>Denton</td>
<td>USA</td>
</tr>
<tr>
<td>Kenworth</td>
<td>Australia</td>
</tr>
<tr>
<td>Dynacraft Algona</td>
<td>USA</td>
</tr>
<tr>
<td>Dynacraft Louisville</td>
<td>USA</td>
</tr>
</tbody>
</table>

1 INTRODUCTION

PACCAR maintains high standards of quality for all of our products and services. Our products are well engineered, highly customized for specific applications and sell in market segments where they have a reputation for superior performance and pride of ownership.

PACCAR’s success is due to our reputation for unsurpassed quality. Much of that is a result of the outstanding performance of our suppliers.

This Supplier Quality Requirements Manual has been created to communicate PACCAR Quality requirements supporting production of world-class products.

1.1 Document Revision Control

This Supplier Quality Requirements Manual is effective June 8, 2016 and supersedes all previous PACCAR Supplier Quality Requirement documents.

1.2 Quality Agreements (DAF only)

This document is complementary to existing Quality Agreements (addendum to the Long Term Agreement). In case of any disagreement between this document and a Quality Agreement, mutually signed before October 30, 2014, the Quality Agreement prevails.

1.3 Reference Quality Manuals and Standards

ISO9001, ISO14001, PPAP, APQP, FMEA, MSA, ISO/TS 16949, and other reference materials noted in this manual are available from the Automotive Industry Action Group (www.aiag.org). The latest edition of all manuals and guides are to be used.
1.4 Communication and Information

When the ePortal is referenced in this document, the following Internet addresses should be used:

For PACCAR facilities in North America:

https://eportal.paccar.com

For PACCAR facilities in Europe and Brasil, please use DAF-SupplierNet:

https://eportal.daf.com

For PACCAR facilities in Australia:

https://eportal.paccar.com

DAF-SupplierNet and the PACCAR ePortal provide general information (e.g. manuals, forms and templates), news and supplier-specific information such as performance results, PPAP information and PPAP document upload capability.

Suppliers are required to check their supplier ePortal regularly for new information and maintain up-to-date contact information at all times.

1.5 Quality Systems

PACCAR requires all production suppliers to meet the requirements outlined in this manual. PACCAR requires Tier 1 suppliers to apply these same standards to sub-tier suppliers providing material, components and services for PACCAR production. The requirements apply to each supplier facility.

Manufactured goods suppliers are required to be registered by an International Automotive Task Force (IATF) accredited registrar to ISO/TS 16949 unless exempted by PACCAR Supplier Quality. Exemptions have a validity date documented on a PACCAR approved quality certification waiver.

Non-manufacturing suppliers (e.g. Warehouses, distribution, cross-dock, etc.) must be registered with an accredited registrar to the latest version of ISO 9001 or ISO 9002 Quality System Requirements, unless specifically exempted by PACCAR Supplier Quality. Suppliers with ISO 9001 or ISO 9002 exemption must have an implementation plan for ISO certification. Exemptions expire one year after approval.

For each renewal or discontinuation of registration, the supplier will notify PACCAR Supplier Quality a minimum of six months before expiration. Quality System registration certificates must be uploaded to the Supplier Quality ePortal. Failure to upload renewed certifications will result in a penalty to supplier performance ratings and could impact future business. Any suspension in certification status must be reported to PACCAR Supplier Quality within five business days.

PACCAR requires REACH compliance for all shipments to participating European countries, as described in TLV00805-102 in the ePortal. Reference RoHS Directive (2011/65/EU).

Suppliers are also encouraged, but not required, to obtain:
- ISO 14001 Environmental Management registration and certification
- Occupational Health and Safety Assessment Series (OHSAS)18001 certification
- International Material Data System (IMDS) registration
2 PACCAR SUPPLIER APPROVAL PROCESS

Suppliers are approved to do business with PACCAR and its divisions upon successful completion of the supplier approval process. The process includes:

   a) A review of the supplier's business model, financials and organizational capability (Suppliers Questionnaire).
   b) Completion of an on-site audit or Supplier Readiness Review (SRR) to evaluate a supplier's business systems. See Section 5.4 for more information.

The audit must result in an overall Low Risk score and formal approval by PACCAR Supplier Quality before the supplier is considered a PACCAR-approved supplier. If the audit results in a score of Medium or High Risk, the supplier is required to provide a corrective action plan, including due dates, within 10 business days. Suppliers are encouraged to use continuous improvement methods, such as Six Sigma, to realize the actions defined in their corrective action plan. Business will not be awarded to suppliers who have not achieved “approved status,” except at PACCAR’s discretion.

Supplier approval is made on a facility-by-facility basis and is non-transferable to other supplier facilities. Approval remains in effect until revoked by PACCAR for cause, including (but not limited to):

   a) Facility closure
   b) Facility acquired by new ownership
   c) Poor performance
   d) No purchasing activity (receipts) for two consecutive years
   e) Change in facility risk assessment
   f) Loss of quality certification
   g) New Business Hold

Suppliers must notify PACCAR of any changes in the business environment that affect the approved facility, as described above (see Section 8).

Suppliers may be required to complete self-audits (according to the SRR form) or periodic on-site assessments to assure compliance to PACCAR requirements. Supplier Quality will notify the supplier when this assessment is required.
3 SUPPLIER PERFORMANCE STANDARDS

3.1 Supplier Performance Metrics

PACCAR measures quality performance for each supplier facility, as defined by a unique PACCAR supplier code. Performance is evaluated using any of the following metrics, where applicable:

- Quality PPM
- Non-conforming part/Warranty PPM
- PPAP On-Time %
- PPAP Approval %
- On-Time Delivery %
- Number of rejects (defects) and incidents (tags)

Suppliers are rated A, B, C or D for each applicable metric, as shown in Table 1 below. The actual value, along with the rating, can be found on the ePortal.

Performance Standards

<table>
<thead>
<tr>
<th>Metric</th>
<th>Time Frame</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quality PPM</td>
<td>12 Month Rolling</td>
<td>≤ 10</td>
<td>≤ 50</td>
<td>≤ 250</td>
<td>&gt; 250</td>
</tr>
<tr>
<td>Warranty PPM</td>
<td>12 Month Rolling</td>
<td>≤ 10</td>
<td>≤ 50</td>
<td>≤ 250</td>
<td>&gt; 250</td>
</tr>
<tr>
<td>PPAP On-Time %</td>
<td>3 Month Rolling</td>
<td>= 100%</td>
<td>≥ 95 to &lt;100%</td>
<td>≥ 90 to &lt;95%</td>
<td>&lt; 90%</td>
</tr>
<tr>
<td>PPAP Approval %</td>
<td>3 Month Rolling</td>
<td>= 100%</td>
<td>≥ 95 to &lt;100%</td>
<td>≥ 90 to &lt;95%</td>
<td>&lt; 90%</td>
</tr>
<tr>
<td>On-Time Delivery %</td>
<td>Monthly 3 Month Rolling 12 Month Rolling</td>
<td>&gt;98%</td>
<td>=98%</td>
<td>=95 to &lt;98%</td>
<td>91 to &lt;95%</td>
</tr>
</tbody>
</table>

Suppliers are expected to access the ePortal Supplier Scorecard regularly to monitor their performance. Questions regarding these metrics should be directed to PACCAR Supplier Quality. See Section 10.1, Appendix A, for Quality and Warranty PPM calculations.

Note the Quality PPM metric is general in nature and is not intended to imply capability requirements of individual drawing tolerances/requirements for either Special Characteristic or non-Special Characteristic features. See Section 5.2 for Special Characteristic details.

3.2 Non-Conforming Product or Service

The following are quality defects that will be counted in the PPM metric:

- Any component, sub-assembly, assembly or product, process-related service found to be non-compliant to the drawing, CAD model, specification, applicable quality standards, agreements or master samples approved by Engineering and Quality will be rejected and considered as a Quality non-conformity.
  - Any specifications assigned to a component or sub-assembly of a purchased assembly shall be subject to PACCAR quality requirements as stated above.
Production parts damaged as a result of non-standard packaging (not per PACCAR specification) or production parts damaged from inadequate packaging or transportation for which the supplier is responsible. Parts with incorrect shipping documentation (e.g. packing slips), incorrect quantities or parts shipped to the wrong facility and directly affect PACCAR production, for which the supplier is responsible.

- Defective product found after the 24-hour containment activities at PACCAR locations even if production is not impacted.

Damage or incorrect shipments directly attributable to PACCAR-managed third-party carriers or handlers are assigned to the third party.

All suspect parts will be included in the rejected lot unless the supplier follows the activity roadmap and timing per Appendix B - TS 16949 “Corrective Action” article 8.5.2. If the supplier sorts the rejected lot according to PACCAR requirements, then only defective parts impacting production are counted.

The following will not count in the PPM metric:

- Parts that meet all specifications and boundary samples approved by Engineering and Quality.
- Parts that have not been released and approved for production and/or that have no released drawing. Examples include launch parts, prototype parts, pre-production parts, sample/trial parts, DOE parts, etc.
- Any defects covered by a Deviation Authorization.
- Potential problems the supplier identifies, communicates and takes appropriate action to contain and correct before impacting PACCAR production. Supplier must provide replacement part(s) with “certified” material before required in production.

Upon detection of a non-conforming part, the PACCAR plant may start a request for corrective action.

Upon notification of a non-conforming part, the supplier is expected to:

a) Begin containment of all products within one hour of notification. Suspect product within PACCAR facilities must be contained within 24 hours and not impact production. The PACCAR plant may begin containment sooner, as required, which may involve third party company activities (see 3.4):
   - Supplier is responsible to develop and communicate containment inspection instructions both to third party and the PACCAR plant Quality Assurance Department(s)
   - Containment of PACCAR customers’ vehicles may be required if an escape of the defect from the PACCAR plant has been confirmed
   - The use of third party containment resources is determined by each individual PACCAR plant. Suppliers should contact each PACCAR facility to clarify requirements. See also section 3.4

b) Manage full containment of the entire supply chain, including but not limited to, sub-tier suppliers, warehouses, third-party facilities, supplier facility, and the PACCAR facilities

c) Repair/rework/replace suspect parts as required to maintain production
   - Repair or rework must be performed by either the Supplier’s qualified personnel or a third party on contract to the supplier that has been approved by PACCAR Quality for the specifically designated repair/rework

d) Validate and report daily on containment until three consecutive defect-free shipments after permanent corrective action is established
e) A short-term corrective action is due within three calendar days
f) A permanent corrective action plan is due within 10 business days unless an extension is approved by PACCAR Supplier Quality

g) Implement permanent corrective action using the Corrective Action template provided by PACCAR via the ePortal and/or attached to the non-conforming part email notification
h) Update supplier documentation to reflect corrective actions (i.e. Control plan, FMEA, process maps)
i) Report findings to PACCAR Supplier Quality and affected assembly plant(s) contact for PACCAR approval of corrective actions
j) Ensure corrective actions are implemented in other similar processes and/or parts

Reoccurrence of the defect after the agreed implementation date of the corrective action(s) will result in a new non-conforming part report issuance. In certain cases the supplier may be required to complete another PPAP after corrective actions are completed.

Corrective actions requiring product design or manufacturing process changes must use the Product and Process Change Request (PPCR) process to notify PACCAR. Refer to Section 8, Supplier Product and Process Change Request for details.

The supplier is responsible for all costs associated with validating and implementing corrective actions. PACCAR may initiate charge-backs to the supplier for expenses incurred as a result of non-conforming product outlined in Section 3.3.

PACCAR requires suppliers cascade corrective action requirements to their suppliers. The Tier-1 supplier is responsible for any sub-tier issues and the corrective actions necessary to contain and ensure issues are resolved.

### 3.3 Cost of Poor Quality Policy

All costs incurred by PACCAR that are associated with the failure of a supplier to meet PACCAR’s quality requirements will be charged back to the responsible supplier. PACCAR may require a Return Goods Authorization (RGA) response to a Quality Reject Notification within three business days of notification. If a response to the RGA request is not received within three business days, reject lots will be scrapped and debited to the supplier. An administrative fee may be charged to cover costs associated with dispositioning the non-conforming parts. Additional charges may be issued for both rework and collateral damages as listed below. See the PACCAR Supplier Charge Back Policy Fee Structure on the ePortal for fee amounts. Fees will be debited or invoiced to suppliers. The following is a list of examples of COPQ (Cost of Poor Quality) charges. The list should not be construed as exhaustive:

**Receiving Process**
- Non-conforming part administrative fee (as described above)
- Sorting
- Rework
- Line disruption
- Premium freight
- Cost of increased inspection
- Excess inventory
- Misidentified parts
- Shipping documentation errors
In-Process Fallout
- Downtime
- Overtime
- Repeat testing
- Line speed reduction
- Additional manpower
- Line changes due to material availability
- Equipment breakage
- Associated material losses
- Outside processing required
- Premium product cost paid to support production
- Rework labor, tooling and fixturing

Customer Issues
- Rework at customer premises, travel and manpower
- Replacement of material at customer location
- Premium freight
- Reimbursement of all charges from customer
- Costs of internal containment actions
- Added inspection, certification of product, etc.
- Warranty costs

Other
- Late corrective actions per Appendix B - TS 16949 “Corrective Action” article 8.5.2
- Repeat issues resulting from the same failure mode
- Late or incomplete PPAP submissions

Charge back may be transacted as a debit against open invoices (debit note required to be issued for the particular invoice). Suppliers will be charged the higher of either the minimum rework fee shown in the PACCAR Supplier Charge Back Policy Fee Structure or actual rework costs.

3.4 Controlled Shipping
When non-conforming product is identified at a PACCAR plant, PACCAR reserves the right to require containment by a PACCAR-approved third party at the supplier’s expense. Controlled Shipping is ongoing end-of-process verification of product compliance and is above and beyond containment of a non-conforming product.

PACCAR uses two levels of containment, Controlled Shipping 1 (CS1) and Controlled Shipping 2 (CS2). CS1 and CS2 are 100 percent inspection post process and serve as a quality firewall:

- CS1 containment is conducted in the supplier’s facility with supplier resources. CS1 must be started within one hour of notification by PACCAR. Sorting results are reported to PACCAR on a regular basis.
- CS2 containment must be conducted by a third party in the supplier plant within 24 hours of notification by PACCAR. If the supplier is not able to respond within 24 hours after notification, PACCAR reserves the right to commence containment on behalf of, and at the expense of, the supplier.
PACCAR will notify the supplier in writing when CS1 or CS2 is required. This notification will include the affected products or processes, inspection criteria, reporting content and frequencies, and exit requirements. All contained product and packaging must be marked to be clearly identifiable as contained and to distinguish acceptable from suspect product. PACCAR, supplier and containment partner must agree to and confirm the method of containment and written instructions must be available for reference.

Controlled shipping will continue until all exit requirements have been satisfied and PACCAR has agreed to remove controlled shipping status.

3.5 Non-Conforming Part Review

If the supplier disagrees with a non-conforming part identified by PACCAR, a non-conforming part review may be requested.

Suppliers must:

a) Submit the completed Non-Conforming Part Review Request form to the issuing plant’s Quality Assurance Department and their Supplier Quality Manager (contacts available on the ePortal in the Quality Section).

b) Include any supporting documentation with the submission. Examples of such documentation may include but are not limited to:
   - Material certification
   - Coordinate Measuring Machine (CMM) reports
   - Inspection data
   - Visual Quality Acceptance (VQA) standards
   - Photographs
   - Specifications/standards
   - Testing procedures
   - Test results prior to part shipment
   - Test results after part return
   - Objective evidence to support review request
   - Process capability data/SPC

c) Maintain a copy of the form submitted and check status of submissions with the plant’s Quality Assurance Department.

d) Maintain a copy of the submitted form in the supplier’s records for a period of no less than one year from submittal date.

If the supplier and PACCAR determine that resolution of the non-conforming part review will require more than 10 business days, the following is required:

a) Supplier and the issuing plant are to reach an agreement on containment actions during this period. A review form, along with the copy of the agreement, must be submitted.

If the supplier does not agree with the PACCAR plant’s disposition of the non-conforming part review, they may petition their Supplier Quality Manager with justification for a next-level review.
3.6 **Bottom 25 Suppliers**

Suppliers are continuously evaluated to ensure performance meets expectations. The Bottom 25 Suppliers are determined based on performance that includes, but is not limited to number of NCP tags, number of rejected parts, customer and plant impact. Bottom 25 suppliers are expected to present actions quarterly to PACCAR executive management.

PACCAR will provide the standard reporting format for communicating suppliers’ improvement plans:

- a) Effective containment plans
- b) Root cause analyses
- c) Permanent corrective actions and implementation timing
- d) Glide path - predicted future performance
- e) Bottom 25 suppliers are required to complete Six Sigma projects that fix their quality issue(s).

Any supplier placed on PACCAR’s Bottom 25 list for a second consecutive year may be placed on a New Business Hold (NBH).
3.7 Continuous Improvement – 10 PPM Plan/Glide Path/Waterfall

PACCAR expects the supplier to improve quality performance on a continuous basis. The following plans and tools are required to communicate the supplier’s improvement plans.

Terms and definitions:

<table>
<thead>
<tr>
<th>Term:</th>
<th>Explanation:</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 PPM plan</td>
<td>Continuous improvement plan, containing analysis, improvement actions,</td>
</tr>
<tr>
<td></td>
<td>targets and expected results to improve performance to less than 10 PPM.</td>
</tr>
<tr>
<td></td>
<td>A 10 PPM plan may contain one or more glide paths or waterfalls.</td>
</tr>
<tr>
<td>Glide path/Waterfall</td>
<td>Diagram depicting historic, actual and planned results against target values</td>
</tr>
<tr>
<td></td>
<td>over time. Improvement actions and expected effect on quality or delivery</td>
</tr>
<tr>
<td></td>
<td>performance are established on the same timeline.</td>
</tr>
</tbody>
</table>

The supplier must develop and maintain a 10 PPM improvement plan including glide paths for quality, warranty and on-time delivery performance along with Paretos of defects and corrective actions. Targets agreed with PACCAR must be reflected in the glide paths, and PACCAR may request the latest 10 PPM plan and glide paths at any time.

10 PPM plans and glide paths must be reviewed on a regular basis to assess the effect of implemented actions and to ensure that plans exist to generate the required improvements.

The forms required for 10 PPM and glide path presentations are available on the ePortal.

3.8 New Business Hold (NBH):

PACCAR may, at its discretion, place the supplier on a NBH for poor quality, warranty, support, delivery, financial performance or other commercial reasons. Suppliers on NBH will not be eligible to engage in new business until the hold is removed. Suppliers placed on NBH will be notified in writing by Purchasing.

The supplier is required to submit a corrective action plan to PACCAR Supplier Quality within 10 business days of NBH notification.

Before NBH can be lifted, the supplier must demonstrate improved performance as measured by PACCAR metrics and a Low risk rated SRR (see Section 5.4). The supplier will be notified in writing when NBH is lifted.
4 PRODUCTION PART APPROVAL PROCESS (PPAP)

4.1 Definition

PACCAR’s component qualification process is conducted in accordance with the Production Parts Approval Process Manual published by the Automotive Industry Action Group (AIAG). PPAP refers to the latest version of the following reference manuals:

- Advanced Product Quality Planning & Control Plan (APQP)
- Potential Failure Modes and Effects Analysis (FMEA)
- Measurement Systems Analysis (MSA)
- Statistical Process Control (SPC)

PPAP defines generic requirements for production part approval (refer to AIAG Manual). The purpose of PPAP is to validate that all design specifications have been satisfied and that the production process has the capability to produce product that consistently meets these requirements at production volumes.

PACCAR requires PPAP be conducted for:

- All new parts
- Resourced parts

PACCAR may elect to conduct PPAP for:

- Revised parts
- Parts from new or modified production processes
- Changed manufacturing line or production location
- Changed components and/or sub-tier Suppliers

Specific submission requirements are determined by the PPAP level (1-5) requested and are defined in the AIAG manual. PACCAR reserves the right to select and assign PPAP levels, at its discretion, based on experience, supplier performance and specific needs.

PPAP is required for all Tier-1 Supplier facilities providing production parts or production materials. PACCAR reserves the right to waive PPAP completion or submission requirements.

For parts produced from multi-cavity tools, fixtures, dies, etc. (i.e. injection molding, casting, die casting, etc.), a supplier must submit dimensional reports for each tool cavity, along with part samples representing the shortest and longest flow length within the tool, when requested.

Suppliers are expected to complete and retain all PPAP documentation. Archived PPAP files must be available for review within 24 hours of request.

PACCAR Supplier Quality will establish a PPAP submittal date based on quoted or otherwise agreed to lead times.

4.2 Submission of PPAP Documents and Sample Parts

Samples shipped to the assigned inspection plant must be packaged separately from production parts and clearly marked to segregate from production materials. Use approved submission labels found on the ePortal. Sample parts are NOT to be included in EDI transmissions or Advanced Shipping Notices (ASN) when shipped to any PACCAR plant.

Due dates and requested PPAP deliverables are provided to suppliers via the ePortal. PPAP deliverable templates for other documents such as Significant Production Run Declaration (SPRD) are available on the ePortal.
When submitting PPAP, documents are to be uploaded to the ePortal. All documents submitted are subject to PACCAR non-disclosure agreements with the supplier. PPAP approval constitutes acceptance of the individual documents submitted.

Samples submitted for PPAP submissions are for the purpose of validating requirements. As such, the part may be marked, scribed, or altered to fit measuring equipment as part of the review. PACCAR will return samples upon request by supplier once the PPAP process is completed and the part approved.

4.3 Supplier Consent to PPAP Plan

When Supplier Quality initiates a PPAP request, requirements communicated to the supplier include due dates, specification of PPAP documents and other quality assurance actions. The supplier will identify completed actions and upload PPAP documents by the given due dates via the ePortal.

PPAP date extensions will not be considered unless the delay was due to PACCAR cause.

4.4 Blanket PPAP

A primary or parent part number that covers all variants of the part family is designated by PACCAR Supplier Quality. Individual Part Submission Warrants (PSW) are not needed.

At PACCAR’s discretion, a blanket PPAP submission may be accepted for a family of parts, where:

a) Minimal changes occur between parts of similar construction (e.g. length or color)
b) Multiple parts are manufactured by common processes and materials are listed on a single drawing as a variation of a base drawing
c) A configuration change is made to a product by the PACCAR Part Number Generator system

4.5 Approval Process

Approval for PPAP is given by means of a Part Submission Warrant (PSW).

PPAP evaluation may result in either:

- Approval
- Rejection:
  - PACCAR informs the supplier of the reasons for rejection
  - The part(s) are not acceptable for production
  - After resolving root causes, the supplier submits a new PPAP
- Interim Approval:
  If a non-conformance is found within the PPAP submission, PACCAR may issue a concession/deviation for the requirement for a limited time. The part will be given an Interim Approval (IA) PPAP status, indicating the part is considered acceptable for production for the duration of the concession/deviation. An IA PPAP status is NOT an approval. The supplier is required to correct the non-conformance and resubmit the PPAP prior to expiration of the deviation. Upon Interim Approval:
    - PACCAR informs the supplier of the reasons for IA and the period of time or number of pieces for which the status is valid.
    - If corrective actions cannot be implemented and the PPAP is not approved before the end of the deviation period, the supplier must request and obtain PACCAR approval for extension of the deviation. Contact Supplier Quality.
    - The PPAP will move to rejected status at the end of the deviation period.
    - PACCAR may require that extra quality assurance measures be taken by the supplier during the period of IA.
4.6 **PACCAR PPAP Status Notifications**
PACCAR will notify suppliers of changes to PPAP status via the ePortal or e-mail within 24 hours.

PACCAR will include an electronic copy of the completed PSW in the Supplier Documents folder of the PPAP collaboration, or it will be sent to the supplier by e-mail.

4.7 **PACCAR Plant-Specific Purchases (North American Plants)**
Suppliers are expected to ensure that any product they sell to PACCAR meets the drawing and all specifications.

Discrete orders that are classified as plant buys, or "E-buys", do not require a formal PPAP submission, but the supplier is required to provide PACCAR with parts that meet the print and all applicable specifications.

A First Article Inspection Report may be requested to be submitted with product. The supplier will be given advance notice of this requirement.

Any order from PACCAR represents approval to ship parts regardless of initial PPAP status and satisfies ISO/TS 16949 audit requirements from a customer perspective. This does not cover supplier-initiated product or process changes to existing PPAP approved parts. See section 8, Product and Process Change Request (PPCR).

4.8 **Annual Validation**
Suppliers shall complete annual validation in order to demonstrate continued adherence to proper engineering levels and performance to design intent. This annual requirement must be documented on the supplier’s Control Plan. Suppliers are not required to submit annual packages unless requested by PACCAR. However annual documentation should be readily available according to the retention policy described in section 4.9.

The annual validation may include a full PPAP submission or selected elements of the submission. In no case should any of the documents submitted be more than one-year-old.

In all cases the supplier shall review their files annually to ensure they are current. Some PACCAR specifications require suppliers to submit reports to the PACCAR Technical Center (PTC) annually. A separate PPAP notice will not be sent to the supplier.

4.9 **Record and Product Sample Retention**
Suppliers must have a method to provide for safe and accessible retention of all records relating to PPAP submissions for the production and service life of the part. Archived data must be available within a 24-hour period.

PACCAR requires record retention duration as outlined in Section 9. If a Supplier no longer manufactures a production part or stops doing business with PACCAR, they are still responsible for record maintenance for the production and service life plus one calendar year. The Supplier must provide PACCAR with the record storage facility, a contact name, address and phone number. PACCAR retains the right to access and copy any of these documents.

PACCAR requires suppliers to retain Significant Production Run Samples for a minimum of 30 days after the PPAP submission is approved.
4.10 PACCAR Supplier PPAP Self-Certification

Suppliers may apply for PPAP self-certification by submitting a request form to their SQM for consideration and routing. A signed copy of the request form will be returned to the supplier for their records if approved.

Suppliers who become self-certified will only be required to submit to PACCAR Supplier Quality a Level 4 PPAP - PSW, Part Marking Traceability Photo, and completed Production Intent Run (PIR) form. The supplier is still required to follow all PPAP procedures and maintain all PPAP documents and parts as required by AIAG guidelines.

By applying for self-certification, the supplier agrees to the following conditions:

- At any time, the supplier is subject to an audit that requires the supplier to submit requested documentation and/or parts for any approved PPAP that PACCAR designates for verification. Required documents must be submitted to PACCAR for verification within 24 hours of request.
- PACCAR reserves the right to revoke the supplier self-certification status at any time and for any reason.
- If self-certification is revoked, the supplier can re-apply for self-certification.

To be considered for self-certification, suppliers must meet requirements that include but are not limited to the following (see application form for specific minimum requirements):

- TS 16949 Registered
- 12-Month PPAP First Time Approval Score
- 12-Month PPAP On Time Delivery Score
- 12-Month PPM Score OR Number of monthly NCP Tags from the prior 12 month period
- Minimum Number of Annual Receipts
- All measuring equipment including CMM and Arms must have current calibration certifications and completed MSA
- Corrective actions must be tracked and closed in less than 30 days or by the SQM approved deadline
- All coating and paint certifications are current and on file with the PACCAR Technical Center
- Testing Complete:
  - A production part taken from supplier process and a full functional inspection verification
  - Sample sent to PACCAR for inspection to compare results

PACCAR reserves the right to refuse or cancel self-certification for any reason.
5 NEW PROJECT OR PRODUCT LAUNCH

5.1 Advanced Product Quality Planning (APQP)

PACCAR requires suppliers to use APQP, as outlined by the Automotive Industry Action Group (AIAG) in the Advanced Product Quality Planning and Control Plan manual.

The APQP process is required for all product and process development projects, including new product and process launch, product and process modification, and change of manufacturing location. At PACCAR’s discretion, the supplier will be requested to submit APQP documentation for review. The PACCAR APQP tools can be found on the ePortal. For more information, suppliers should contact PACCAR Supplier Quality.

Suppliers are required to use the PACCAR APQP workbook, or an approved alternative, and submit status updates on a regular basis. The reporting frequency is at the discretion of the responsible Supplier Quality Manager. A significant change in status requires an immediate update.

5.2 Classification of Characteristics

Terms and abbreviations: Refer to Corporate Standard CPS0484 Section 5 for definition and classification of Special Characteristics

Generic terms:
- \( Cp/Pp = \) Process potential
- \( Cpk/Ppk = \) Process capability

Capability indices are a measure of how well the process can produce parts within specification.

PACCAR Engineering defines the features that are designated as Special Characteristics on the drawing for PACCAR proprietary designs. Supplier Engineering is responsible to define Special Characteristics and obtain PACCAR Engineering approval for supplier-responsible designs.

- See AIAG PPAP manual under section 2.2.11 Initial Process Studies
- Refer to PACCAR’s Corporate Standard CPS0210 Special Characteristics: Drawing Conventions for symbol use and location designation on drawings
- Refer to PACCAR’s Corporate Standard CPS0484 Special Characteristics: Process Requirements Section definition, use and control of special characteristics
- See AIAG PPAP manual – Quality Indices

The supplier is responsible for reviewing new or revised drawings from PACCAR for Special Characteristics and taking the following action as appropriate:

a) Identify the processes used to maintain the part characteristics that PACCAR has classified.

b) The supplier must investigate, confirm and document the ability to manufacture the part to meet all proposed Special Characteristics, including risk analysis, by means of process FMEA.

c) If the supplier is not able to meet the requirements/Special Characteristics, the supplier must inform PACCAR Purchasing and Supplier Quality. 100 percent inspection is required for all non-capable features with Special Characteristics.

d) Processes must be capable of meeting or exceeding the process capability requirements described in the AIAG PPAP manual under Acceptance Criteria for Initial Study or as established by PACCAR Engineering

e) Establish a process control plan for the component that includes the Special Characteristics and associated processes
f) Specify the Statistical Process Control (SPC) technique and frequency of readings or process audits for the designated characteristics.
g) Continued production SPC (See AIAG SPC manual) is required for all Special Characteristics noted on drawings and process control plan.
h) If a Special Characteristic is a pass-through characteristic from a sub-tier supplier, the Tier-1 supplier must ensure on a continuous basis that capability requirements are being met.
i) The sample size or inspection plan should follow the guidelines in the AIAG manuals for SPC, APQP and PPAP.
j) A Measurement Systems Analysis (MSA) must be completed for each Special Characteristic, and the error must be calculated and included in the study results (see Section 5.6 for additional MSA information).
k) The supplier must submit initial process studies for PPAP approval, including normality test results, SPC charts, and photographs of the inspection setup, for review by PACCAR Engineering and Supplier Quality.
l) If an associated production process is not statistically in control and capable, the supplier must establish a corrective action plan in accordance with the AIAG PPAP manual. An effective 100 percent inspection process documented in the control plan must be in place until the process is brought into compliance.
m) Suppliers are expected to continue monitoring Special Characteristics throughout the life of the product and ensure the process remains in control and capable. Contact PACCAR Engineering or Supplier Quality for additional information.

PACCAR reserves the right to add capability, SPC charts and process control requirements based on performance history, low capability, or other factors, up to and including 100 percent containment.

In addition to initial capability analyses and statistical process control submissions required for PPAP, PACCAR reserves the right to require the supplier to submit monitoring results at any time.

Unless otherwise specified on the drawing, refer to PACCAR Corporate Standard CPS0484 Special Characteristics: Section 7.1 Table 1 for capability requirements.

PACCAR requires the use of Cpk, in addition to Ppk, for ongoing production process control evaluation in situations where sufficient data, a stable process, and appropriate subgroups exist.

PACCAR requires the use of Ppk in all instances. When evaluating ongoing production process control, Cpk may also be reported but there must be sufficient data, a stable process, and appropriate subgroups. If subgroups are not used, Cpk should not be submitted.

These requirements apply to the entire supply chain, including sub-tier manufacturers. All Special Characteristics must have capability studies performed at least once per year with the results recorded in the Control Plan, unless explicitly stated otherwise.

Actual capability must be demonstrated on request.

The Quality Indices for each SC/CC may be established on a case-by-case basis by the responsible engineering group and acknowledged by the supplier by documenting specific control methods in the supplier’s Process Control Plan.
5.3 Cleanliness
To ensure the cleanliness and quality of parts, PACCAR provides cleanliness specifications where required. Cleanliness requirements and test requirements are defined in PACCAR Corporate Standard, CPP0331. The cleanliness class is identified in the notes field on the drawing.

The supplier may be required to include written evidence of cleanliness conformance, including capability and run charts, with the PPAP submission when CPP0331 is specified on the part drawing or technical requirements. The part cleanliness requirement shall be indicated in the control plan as a special product/process characteristic.

5.4 Supplier Readiness Reviews (SRR)
The Supplier Readiness Review (SRR) is an assessment tool that evaluates potential risks to quality or supply that must be corrected.

SRRs are used in a variety of circumstances to assess risk:
- Introduction of new product or process technology
- Introduction of a new technology to PACCAR
- Significant increase in business to a supplier facility
- Major project or new product launch
- Performance issues
- Supplier development

SRRs evaluate:
- Engineering
- APQP
- Project management
- Change control
- Purchasing
- Sub-tier management
- Control of incoming goods
- Manufacturing
- Materials handling
- Outgoing logistics
- Continuous improvement
- Quality assurance
- Problem solving
- Certifications
- Capacity
- Embedded Software

Multiple assessments may be conducted during different phases of a project, or sections of the SRR may be used individually. SRRs are led by Supplier Quality and may involve multiple PACCAR functional personnel. A description of the SRR process is available via the Supplier ePortal.

SRRs are evaluated as Low, Medium or High Risk. Any score other than Low requires the supplier to submit an improvement plan within 10 working days or as requested by Supplier Quality.

PACCAR encourages suppliers to perform self-audits using the SRR tool at least once per year.
### 5.5 PACCAR Project Sample and Build Phases

<table>
<thead>
<tr>
<th>Sample Type</th>
<th>Term</th>
<th>Europe, Brasil, Columbus Engine Plant</th>
<th>US, Mexico, Canada</th>
</tr>
</thead>
<tbody>
<tr>
<td>A sample</td>
<td>Samples suitable for concept studies. No requirements on supplier manufacturing process. Parts must meet specification.</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>B sample</td>
<td>Samples suitable for functional and durability testing. Supplier manufacturing process production intent, but tools can be in prototype stage.</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>C sample</td>
<td>Samples suitable for field trial validation. Supplier manufacturing process and tools production intent.</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>P sample</td>
<td>Samples suitable for series production. Supplier process is final series process, PPAP approved.</td>
<td>N/A</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Build Phases</th>
<th>Pre-series</th>
<th>Production trial run: Supplier parts at B, C or P sample status.</th>
<th>Production trial run: Supplier parts may be prototype tooled.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quality Validation (QV)</td>
<td>Production run: Supplier parts intended to be P sample.</td>
<td>Production run: Supplier parts must be production tooled</td>
<td></td>
</tr>
<tr>
<td>Volume Validation (VV)</td>
<td>Production run at rate: Supplier parts intended to be P sample status.</td>
<td>Production run at rate: Supplier parts must be from production process and PPAP approved</td>
<td></td>
</tr>
<tr>
<td>Job-1 or Start of Production (SOP)</td>
<td>Start of series production.</td>
<td>Start of series production</td>
<td></td>
</tr>
</tbody>
</table>
5.6 Measurement Systems Analysis (MSA)
Suppliers are required to perform a Measurement Systems Analysis (MSA) for all measuring and test devices referenced in the control plan (reference the latest version of the AIAG Measurement Systems Analysis manual for analysis). An acceptable MSA is necessary to understand if the measurement system is repeatable and suitably accurate. Data generated using an unacceptable measurement system will be rejected.

Acceptable limits for MSAs:

<table>
<thead>
<tr>
<th>Percent Repeatability &amp; Reproducibility (% R&amp;R)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 10%</td>
</tr>
<tr>
<td>Between 10% and 30%</td>
</tr>
<tr>
<td>Greater than 30%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Precision to Tolerance Ratio (P/T)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 10%</td>
</tr>
<tr>
<td>Between 10% and 30%</td>
</tr>
<tr>
<td>Greater than 30%</td>
</tr>
</tbody>
</table>

* Requires PACCAR Supplier Quality Management Approval

5.7 Failure Mode and Effects Analysis (FMEA)
For each new or modified product or process, the supplier must perform a Design FMEA (if the supplier is design responsible) and a Process FMEA, in accordance with ISO/TS 16949 and the AIAG Potential Failure Mode and Effects Analysis reference manual.

5.8 Control Plan
The supplier must implement and maintain control plans in accordance with ISO/TS 16949 and the AIAG APQP manual.

The supplier must provide written control plans to PACCAR Supplier Quality upon request.

5.9 Process Flow Diagram
The Process Flow Diagram must define:
- Each process operation the supplier uses or plans to use to manufacture its products numbered in sequential order
- Key Control Characteristics for each process operation
- Inspection gauges that will be used to measure each Special Characteristic
- A graphical representation of the process
- The operator requirements
- Any potential sources of variation

The supplier may use their own documented format as long as it provides the information required.

The supplier must submit process flow diagrams to PACCAR Supplier Quality upon request. If the supplier deems the process flow diagram subject to confidentiality, the supplier can agree with Supplier Quality on the appropriate level of detail to be shared.
5.10 Significant Production Run
For all new or modified product/processes, PACCAR requires a Significant Production Run (or Production Intent Run, PIR) of at least 30 parts, unless explicitly stated otherwise. A Significant Production Run must be conducted at the site of final production, at production rate, using final tooling, gauging, production process, production materials and production operators. Products produced must meet all requirements. The supplier is required to conduct a Run-at-Rate capacity evaluation during the Significant Production Run.

PACCAR reserves the right to be present during the Significant Production Run.

5.11 Safe Launch Plan (SLP)
PACCAR requires its suppliers to develop a SLP for all new products and process launches. The SLP is intended to provide both PACCAR and the supplier protection from product non-conformances during the launch of a project. The SLP may consist of, but is not limited to:

- a pre-launch control plan with additional or heightened inspection, increased sample sizes and frequencies
- 100 percent inspection of all pre-production parts with traceability to serialized and labeled parts

An SLP is required in the following situations:
- Process: new, changed, moved or re-sourced processes
- Product: new, transferred or changed product

PACCAR requires the supplier to identify any increased risk for new parts and implement the SLP accordingly. PACCAR Supplier Quality may define additional specific requirements for the pre-launch control plan and launch products.

SLP requirements:

a) When creating the SLP, all significant, critical, safety, appearance, and fit/form/function characteristics must have increased inspection. The output of the SLP is a pre-launch control plan approved by PACCAR Supplier Quality. The SLP should be documented using Special Work Instruction templates.

b) Inspection frequencies and sample sizes are expected to be 100 percent for all heightened inspection, or as specified by PACCAR Supplier Quality.

c) Discrepancies, non-conformances and concerns identified during the SLP process must be resolved using a robust problem solving format. PACCAR reserves the right to request submission of corrective actions for SLP-identified items. PACCAR expects the use of the corrective action tool provided on the on the ePortal website. One hundred percent containment of the issue is required until the corrective action is validated.

d) Europe and Brasil only: For product delivered from a production set up different from the intended series manufacturing processes (e.g. prototype tooling, equipment installed at a different facility, different layout or logistics, or more manual operations), a Controlled Deviation may be granted and requires that:
   - All products must be 100 percent measured/inspected with dimensional reports traceable to the individual parts
   - If requested, dimensional reports, material certificates, test results, Measurement Systems Analysis and Appearance Approval Reports must be submitted before dispatch of the products to the PACCAR plant

e) Suppliers are required to obtain approval from PACCAR Supplier Quality for all proposed modifications to the SLP

The supplier is required to use the pre-launch control plan until specified exit criteria are met or three months of production at 0 PPM is achieved.
5.12 Sub-tier Management
For all production parts and services, the supplier should ensure all sub-tier suppliers follow the same processes as described above and approve all sub-tier suppliers through a product and manufacturing process approval procedure recognized by PACCAR. Supplier will submit this information to PACCAR upon request.

ISO/TS 16949 requires all sub-tier suppliers who contribute to, or have influence on, finished goods product quality to be ISO9001 registered.

Tier 1 suppliers are responsible for sub-tier supplier quality including those that are PACCAR-directed. Supplier shall flow down requirements to their sub-tier suppliers that enables supplier to meet PACCAR product print, specification, quality expectations, and any contractual agreement. PACCAR reserves the right to specify or approve sub-tier suppliers contracted by its suppliers for work performed on PACCAR material. This applies to all suppliers including special process (Non-Destructive Testing, Heat Treating, Welding, Chemical Processing, Plating and Coatings), material testing services, and distributors.

6 EMBEDDED SOFTWARE REQUIREMENTS

For products incorporating software, the supplier must include and maintain a complete set of software design documentation in the design record for the product, according to the PPAP requirements.

Software must be developed in a controlled way, with well-defined product lifecycle stages, processes, deliverables and quality levels. Cooperation and co-development between PACCAR and the supplier is made possible by adhering to standards applicable in the automotive industry.

Design record information shall be maintained for each software package and each dataset with full traceability to product identification, product specifications and product test reports. Each software package and dataset, and versions thereof, must be uniquely identifiable.

As part of the APQP process, the supplier provides release notes for every release of the software package or dataset. This document contains the following information:

- Product name and ID
- Device name and ID (where software or dataset is programmed in)
- Software/Dataset name, version and checksum
- Release history
- Specification name and version
- List of changes compared to previous release
- List of solved defects compared to previous release
- List of open/known defects
- List of tests performed
- Intended use

The PACCAR APQP workbook on ePortal contains additional requirements for embedded software, including the timing of delivery.
The supplier must develop and maintain software according to:

Process Reference Model:
- Preferred: ASIG-PRM (Automotive Spice), minimum according to HIS-Scope
- Alternative: ISO-12207 (Non-Automotive Software Lifecycle Processes)

Process Assessment Model:
- Preferred: ASIG-PAM at a minimum level 2; level 3 or higher is preferred
- Alternative: ISO-15504 (Non-Automotive Spice) or SEI-CMMi

Product Quality Model:
- ISO-25010 (SQuaRE), HIS-Metrics, MISRA, AUTOSAR

For safety critical products:
- Preferred: ISO-26262 (Automotive SIL)
- Alternative: ISO-61508 (Non-Automotive SIL)

Detailed description of PPAP requirements for embedded software, in addition to the general AIAG-PPAP requirements (see chapter 4 of this manual):

<table>
<thead>
<tr>
<th>ID</th>
<th>PPAP Document</th>
<th>Specific for Embedded Software</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Design record</td>
<td>For each software package: specifications, top-level design (architectural diagram) and list of tier-2 suppliers (e.g. for OS, CAN stack)</td>
</tr>
<tr>
<td>5</td>
<td>Process flow diagram</td>
<td>For each software package and data set: process flow from configuration management system/release database to programmed and tested electronics</td>
</tr>
<tr>
<td>10.2</td>
<td>Performance test results</td>
<td>Summary test reports for each software level per software package and data set, functionally stating which tests are performed and their results (e.g. design rule check, signal integrity test, FMEA test, stress test, functional test)</td>
</tr>
<tr>
<td>17</td>
<td>Customer-specific requirements</td>
<td>Final release note for each software package and data set</td>
</tr>
</tbody>
</table>

For submission requirements, please refer to paragraph 4.1 of this manual.

### 7 SUPPLIER REQUEST FOR DRAWING CHANGES (SRDC)

**USA, México and Canada:**
Supplier requests for drawing changes prior to PPAP must be submitted using the PACCAR SRDC PTC® Windchill system. The PTC® Windchill SRDC instructions and training material are located on the ePortal. PACCAR Engineering-approved SRDCs may be used for the design record section of the PPAP submission. SRDC’s are required to be submitted as early possible to avoid delays in PPAP schedules, and preferably submitted along with quotation. SRDCs are effective immediately upon PACCAR approval. Suppliers will receive an automated email notification as to whether the SRDC was approved or rejected. SRDCs for dimensional or tolerance changes submitted post contract must include a capability study of the characteristic(s) in question indicating what can be achieved, in terms of Ppk, with the requested change(s).
SRDCs submitted after PPAP approval will be evaluated to determine if a new PPAP is required (see Section 4.1).

When Engineering updates the PACCAR drawing per the SRDC request, the supplier may be requested to submit a new PPAP. Level of PPAP will be specified by PACCAR.

**DAF and Brasil:**
Suppliers should contact product engineering to request an Engineering Change Request (ECR) for any recommended print revisions.

### 8 SUPPLIER PRODUCT AND PROCESS CHANGE REQUEST (PPCR)

Suppliers are required to request PACCAR approval on intended product and process changes, temporary or permanent, including those at sub-tier suppliers. The purpose of this is to prevent quality and delivery issues from arising in our PACCAR receiving plants and protect our end customer from unevaluated and unapproved changes.

Conditions for PPCR submission are identified in the latest AIAG PPAP manual. Reference:
- AIAG PPAP Manual, under Section 3 – Customer Notification and Submission Requirements, describes the conditions for customer notification. **Table 3.1 should be used as a guideline.**

Typical changes include, but may not be limited to:
- New or refurbished tooling
- Equipment and/or tooling moved
- Changes to the manufacturing facility
- Changes to materials used
- Changes to the supply chain
- A new MRP system
- Part software changes

The Product Process Change Request (PPCR) form and instructions can be found on the PACCAR ePortal. The supplier must formally submit a PPCR to PACCAR at least 12 weeks prior to the planned implementation date of the requested change. PACCAR Supplier Quality will review and coordinate the PPCR with the appropriate PACCAR groups to evaluate the change and obtain complete concurrence. Note that temporary and permanent change requests will use the same PPCR form.

For PPCRs, “Product Change” is interpreted as changes that do not impact released PACCAR or supplier drawings. For changes impacting released drawings, suppliers must submit a “Supplier Request for Drawing Change” (SRDC.)

For PPCRs, “Temporary Change” is interpreted as a deviation from a PPAP approved process or supplier specified product characteristic(s) not shown on the PACCAR drawing. Temporary PPCR approvals are limited to 90 days. To deviate from a product characteristic shown on the PACCAR drawing, suppliers must submit an engineering “Deviation.”

A PPAP submission will be required unless otherwise determined by PACCAR. The supplier will be notified of the PPAP submission requirements via email and ePortal notification. The supplier must not ship product prior to PPCR and PPAP approval.
Contact PACCAR Supplier Quality for clarification of notification requirements.

Failure to comply with this requirement may result in revocation of the existing product PPAP, CS1/CS2 escalation, and/or New Business Hold (NBH).

References:
- AIAG PPAP Manual, under Section 3 – Customer Notification and Submission Requirements, describes the conditions for customer notification. Table 3.1 should be used as a guideline.
- Appendix H – Truck Industry – Specific Requirements under Customer Notifications require suppliers to complete a Product Process Change form to advise of process or product changes

9 RECORDS RETENTION

Production part approvals, tooling records, APQP records, purchase orders and amendments must be maintained for the time that the part (or family of parts) is production and service active, plus one calendar year, unless otherwise specified by PACCAR.

NOTE: Supplier-issued purchase orders and amendments for PACCAR-owned tooling are included in this requirement.

Quality performance records (e.g. inspection and test results) must be retained for three calendar years after the year they were created, unless otherwise specified. Records of internal quality system audits and management reviews must be retained for three years.

These requirements do not supersede any regulatory requirements. All specified retention periods must be considered minimum requirements.

10 APPENDICES

10.1 APPENDIX A - Metrics Calculations

Quality PPM Calculation:

The calculation of “Parts per Million” is:

\[ \text{PPM (n)} = \frac{R}{P} \times 1,000,000 \]

where:

- \( R \) = The total number of rejected parts delivered by supplier in the last \( n \) months
- \( P \) = The total number of parts received from this supplier in the last \( n \) months
- \( n \) = The number of months over which the PPM is calculated, typically 1, 3 or 12 months

Delivery Metrics (North America): On Time Shipment:

Warranty PPM Calculation:

\[ \text{Warranty PPM} = \frac{\# \text{Claims received over the last 12 months}}{\# \text{Receipts over the last 15 months}} \times 1,000,000 \]
## 10.2 APPENDIX B - PACCAR Specific ISO/TS 16949 Requirements

<table>
<thead>
<tr>
<th>TS 16949 Article</th>
<th>Text</th>
<th>PACCAR Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.2.2 Quality manual</td>
<td>The organization shall establish and maintain a quality manual that includes a) the scope of the quality management system, including details of and justification for any exclusions, b) the documented procedures established for the quality management system, c) a description of the interaction between the processes of the QMS</td>
<td>An organization's facility is not permitted to register only one part of the organization for the demonstration of capable quality systems (i.e. one product line or operational area).</td>
</tr>
<tr>
<td>4.2.3 Control of documents</td>
<td>Documents required by the QMS shall be controlled. Records are a special type of document and are governed by clause 4.2.4.</td>
<td>The organization ensures that the most current revision levels of PACCAR documents/instructions, or external agency documents, are used. PACCAR controlled documents can be found on eportal.paccar.com Suppliers to review for changes to documents monthly.</td>
</tr>
<tr>
<td>4.2.3.1 Engineering specifications</td>
<td>The organization shall have a process to assure the timely review, distribution and implementation of all customer engineering standards/specifications and changes based on customer-required schedule</td>
<td>Special Processes are to be monitored as required by PACCAR requirements. PACCAR reserves the right to request evidence of monitoring for any reason. Special processes include, but are not limited to: heat treat, coating, plating, adhesive application, and welding.</td>
</tr>
<tr>
<td><strong>TS 16949 Article</strong></td>
<td><strong>Text</strong></td>
<td><strong>PACCAR Requirement</strong></td>
</tr>
<tr>
<td>----------------------</td>
<td>----------</td>
<td>------------------------</td>
</tr>
<tr>
<td>4.2.4.1 Records retention</td>
<td>The control of records shall satisfy regulatory and customer requirements.</td>
<td>Record retention expectation is the production and service active life of the product plus one year. PACCAR requires a minimum of five years retention and a minimum of seven years if Government regulations are involved, regardless of part usage life. These requirements do not supersede any government retention mandates.</td>
</tr>
<tr>
<td>5.2 Customer focus</td>
<td>Top management shall ensure that customer requirements are determined and fulfilled with the aim of enhancing customer satisfaction (see 7.2.1 and 8.2.1).</td>
<td>The organization must demonstrate enhanced customer satisfaction by meeting continuous improvement, Cost Management Program (CMP), productivity requirements and Six Sigma projects</td>
</tr>
<tr>
<td>5.5.2 1 Customer representative</td>
<td>Top management shall designate personnel with responsibility and authority to ensure the customer requirements are addressed.</td>
<td>The organization must notify PACCAR Supplier Quality and Purchasing of any change to senior management, quality management, or company ownership. Supplier is to keep the ePortal contact up to date at all times.</td>
</tr>
<tr>
<td>5.6.1.1 Quality management system performance</td>
<td>Top management shall review the organization’s quality management system, at planned intervals, to ensure its continuing suitability, adequacy and effectiveness. These reviews shall include all requirements of the QMS and its performance trends as an essential part of the continual improvement process.</td>
<td>Up-to-date posting of monthly metrics and a demonstration of management and employee reviews is required. See Measurement section.</td>
</tr>
<tr>
<td>5.6.2 Review input</td>
<td>Customer feedback, internal audits, status of preventative and corrective actions.</td>
<td>See <a href="http://eportal.paccar.com">http://eportal.paccar.com</a> for performance feedback. Supplier is to review documents monthly.</td>
</tr>
<tr>
<td><strong>TS 16949 Article</strong></td>
<td><strong>Text</strong></td>
<td><strong>PACCAR Requirement</strong></td>
</tr>
<tr>
<td>----------------------</td>
<td>----------</td>
<td>------------------------</td>
</tr>
<tr>
<td>6.2.2.2 Training</td>
<td>The organization shall establish and maintain documented procedures for identifying training needs and achieving competence of all personnel performing activities affecting product quality. Personnel performing specific assigned tasks shall be qualified, as required, with particular attention to the satisfaction of customer requirements.</td>
<td>Effectiveness of training must be measured. Example of tools to accomplish requirement are MSAs on inspectors, hands-on testing, and measurement of individual quality performance. PACCAR endorses Six Sigma, Design for Six Sigma, and Kaizen/Lean methodologies.</td>
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<td>6.3.2 Contingency plans</td>
<td>The organization shall prepare contingency plans to satisfy customer requirements in the event of an emergency such as utility interruptions, labor shortages, key equipment failure, and field returns.</td>
<td>These plans are to be kept up to date and can be requested by PACCAR for any reason.</td>
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<td>6.4.2 Cleanliness of Premises</td>
<td>The organization shall maintain its premises in a state of order, cleanliness and repair consistent with the product and manufacturing process needs.</td>
<td>Product cleanliness is included in this requirement when noted on part drawings. PACCAR endorses the use of 5S practices.</td>
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<tr>
<td>7.1 Planning of product realization</td>
<td>NOTE: Some customers refer to project management or advanced product quality planning as a means to achieve product realization.</td>
<td>PACCAR requires the use of the PACCAR APQP workbook for product realization, or a PACCAR Supplier Quality-approved alternative.</td>
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<td>7.1.1 Planning of product realization - Supplemental</td>
<td>Customer requirements and references to its technical specifications shall be included in the planning of product realization as a component of the quality plan.</td>
<td>Product quality planning must include a plan with evidence to meet or exceed all PACCAR requirements and technical specifications.</td>
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<td>7.1.2 Acceptance criteria</td>
<td>Acceptance criteria shall be defined by the organization and, where required, approved by the customer.</td>
<td>PACCAR specifies acceptance criteria for supplied parts (e.g. PPAP, VQA) Any supplier-defined acceptance criteria must be approved by PACCAR.</td>
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<td><strong>7.1.3 Confidentiality</strong></td>
<td>The organization shall ensure the confidentiality of customer-contracted products, projects under development and related product information.</td>
<td>PACCAR Purchasing requires signed confidentiality agreements.</td>
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<td><strong>7.1.4 Change control</strong></td>
<td>Proprietary designs and impact on form, fit and function (including performance, and/or durability) shall be reviewed with the customer so that all effects can be properly evaluated.</td>
<td>PACCAR requires completion and email of a PPCR whenever supplier-initiated changes meet PPAP manual guidelines for notification (Table 3.1). As part of the APQP process, suppliers must have a change management log as evidence of tool, design, or cost changes associated with the program up until PPAP approval.</td>
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<td><strong>7.2.1 Determination of requirements related to the product</strong></td>
<td>The organization shall determine (a) requirements specified by the customer, including the requirements for delivery and post-delivery activities. (b) requirements not stated by the customer but necessary for specified or intended use, where known.</td>
<td>Production plant quality (PPM and incident rate), warranty claims, PPAP acceptance percentage and on-time rates, and on-time shipment percentages are the quality performance metrics PACCAR may use to measure performance of its supply base. Supplier is to review documents and metrics regularly on the ePortal.</td>
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<td><strong>7.2.1.1 Customer-designated Special Characteristics</strong></td>
<td>The organization shall demonstrate conformity to customer requirements for designation, documentation and control of Special Characteristics.</td>
<td>See Classification of Characteristics and PPAP sections for an explanation of PACCAR requirements.</td>
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<td>7.2.2 Review of requirements related to the product</td>
<td>Where the customer provides no documented statement of requirement, the customer requirements shall be confirmed by the organization before acceptance.</td>
<td>A statement of requirements will be supplied by PACCAR for all part purchases. The supplier will be expected to validate their product to the statement of requirements via the PACCAR-approved acceptance criteria (e.g. PPAP, VQA, etc.)</td>
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<td>7.2.3.1 Customer communication - Supplemental</td>
<td>The organization shall have the ability to communicate necessary information, including data, in a customer-specified language and format (e.g. computer-aided design data, electronic data exchange).</td>
<td>Supplier must be able to demonstrate the ability to communicate with all PACCAR electronic data systems (e.g. CAD, EDI, ePortal, etc.)</td>
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<td>7.3.2.1 Product design input</td>
<td>The organization shall identify, document and review the product design inputs requirements, including customer requirements (contract review) such as Special Characteristics (see 7.3.2.3), identification, traceability and packaging.</td>
<td>See Classification of Characteristics (section 5.2). See Traceability Requirement (CPS0098). See PACCAR Packaging Guideline (ML2000).</td>
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<td>7.3.2.3 Special characteristics</td>
<td>The organization shall identify Special Characteristics (see 7.3.3 d) and include all Special Characteristics in the control plan, comply with customer-specified definitions and symbols and identify process control documents, including drawings, FMEAs, control plans, and operator instructions with either the customer's Special Characteristic symbol or the organization’s equivalent symbol or notation to include those process steps that affect Special Characteristics.</td>
<td>See Classification of Characteristics (section 5.2) for PACCAR symbols used. Suppliers may use their own symbols on their drawings but must include them on PFMEAs and Control Plans.</td>
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<td>7.3.6.2 Prototype program</td>
<td>When required by the customer, the organization shall have a prototype program and control plan. The organization shall use, wherever possible, the same suppliers, tooling and manufacturing processes as will be used in production.</td>
<td>PACCAR requires a supplier prototype program that is tracked within the APQP process. Any parts supplied to PACCAR using non-production processes must have a documented control plan for the prototype process.</td>
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| 7.3.6.3 Product approval process | The organization shall conform to a product and process approval procedure recognized by the customer.  
NOTE: Product approval should be subsequent to the verification of the manufacturing process. | PACCAR requires approval to the most current AIAG edition of PPAP manual - Truck section. See PPAP section of Supplier Quality Requirements Manual for specific PACCAR elements. |
| 7.4.1.2 Supplier quality management system development | The organization shall perform supplier quality management system development with the goal of supplier conformity with this Technical Specification. Conformity with ISO9001:2000 is the first step to achieving this goal.  
Note: The prioritization of suppliers for development depends upon the supplier’s quality performance and the importance of the product supplied.  
Unless otherwise specified by the customer, suppliers to the organization shall be third-party registered to ISO9001:2000 by an accredited third-party certification body. | Unless waived by PACCAR, tier 1 suppliers are required to be registered to ISO/TS 16949. PACCAR does not waive the sub-tier ISO9001 registration requirement. Tier 1 suppliers are expected to establish a “fix or leave” strategy for their non-ISO-registered sub-tiers and establish reasonable timelines to achieve this goal. |
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<td>7.4.1.3 Customer-approved sources</td>
<td>Where specified by the contract (e.g. customer engineering drawing or specification), the organization shall purchase products, materials or services from approved sources. The use of customer-designated sources, including tool/gauge suppliers, does not relieve the organization of the responsibility for ensuring the quality of purchased products.</td>
<td>PACCAR does not maintain an approved sub-contractor list but may recommend specific suppliers for assembly of sub-components or to provide specific processes or services. PACCAR and the Tier-1 supplier must work together to assure qualification documentation of existing components. The supplier is required to document sub-components and sub-contractors as part of PPAP submission. <strong>Tier-1 supplier is ultimately responsible for product quality of the assemblies and sub-components they provide.</strong></td>
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<td>7.4.3 Verification of purchased product</td>
<td>Where the organization or its customer intends to perform verification at the supplier's premises, the organization shall state the intended verification arrangements and method of product release in the purchasing information.</td>
<td>PACCAR requires its Tier-1 supplier to use this Supplier Quality Requirements Manual with their sub-tier suppliers, including PPAP, supplier audits, corrective action and containment processes for quality defects.</td>
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| 7.4.3.2 Supplier monitoring | Supplier performance shall be monitored through the following indicators:  
   - Customer disruptions including field returns  
   - Delivered product quality  
   - Part evaluation by designated laboratory | PACCAR may evaluate its suppliers using the following metrics:  
   - PACCAR plant rejection rate (ppm),  
   - Warranty claim rate (ppm)  
   - PPAP first submission acceptance rate  
   - PPAP on-time rate |
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| 7.5.1.1 Control plan | The control plan shall  
- List the controls used for the manufacturing process control,  
- Include methods for monitoring of control exercised over Special Characteristics (see 7.3.2.3) defined by both the customer and the organization,  
- Include the customer required information, if any,  
- Initiate the specified reaction plan (see 8.2.3.1) when the process becomes unstable or not statistically capable. | Control plans for new product introductions can be reviewed as part of either a PACCAR-initiated APQP or Supplier Readiness Review, or when Special Characteristics are present on any of the components.  
Control plans are subject to review with implementation of supplier-corrective actions.  
Control plans are to be submitted with PPAP packages when required. |
| | Control plans shall be reviewed and updated when any change occurs that affects product, manufacturing process, measurement, logistics, supply sources or FMEA (see 7.1.4). | |
| | Note: Customer approval may be required after review or update of the control plan. | |
| | Note: Such evidence may be demonstrated by customer assessment, for example, or by customer-approved second-party assessment that the laboratory meets the intent of ISO/IEC 17025 or national equivalent. | |
| 7.5.1.4 Preventive maintenance | The organization shall identify key process equipment, provide resources for maintenance and develop an effective planned total preventative maintenance system. At a minimum, this system shall include the following:  
- Planned maintenance activities  
- Packaging and preservation of equipment, tooling, and gauging | The supplier must have a documented system for preventive maintenance (PM). This includes a timely review of planned and unplanned maintenance activities and a documented action plan to address any backlog. Action plans are to be included in the Management Review process. The timeliness and effectiveness of PM must be demonstrated when requested. |
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<td>7.5.3 Identification and traceability</td>
<td>Where appropriate, the organization shall identify the product by suitable means throughout product realization. The organization shall identify the product status with respect to monitoring and measurement requirements. Where traceability is a requirement, the organization shall control and record the unique identification of the product.</td>
<td>For NA: See PACCAR std. CPS0098 For DAF: See TKB 00804-089 Identification and Traceability requirements may also be required through the serialization of product pre-PPAP (see Safe Launch Plan, section 5.11).</td>
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<td>7.5.4 Customer property</td>
<td>The organization shall exercise care with customer property while it is under the organization's control or being used by the organization. The organization shall identify, verify, protect and safeguard customer property provided for use or incorporation into the product. If any customer property is lost, damaged or otherwise found to be unsuitable for use, this shall be reported to the customer and records maintained (see 4.2.4). Note: Customer property can include intellectual property and customer-owned returnable packaging.</td>
<td>See Terms and &amp; Conditions of Tooling Orders and Tooling Agreements.</td>
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<td>7.5.4.1 Customer-owned production tooling</td>
<td>Customer-owned tools, manufacturing, test, inspection tooling and equipment shall be permanently marked so that the ownership of each item is visible and can be determined.</td>
<td>A PACCAR tool tag must be attached to each PACCAR-owned capital asset. All PACCAR assets must have an annual audit performed with results submitted to the appropriate division. DAF, Brasil: Supplier must upload pictures from each PACCAR-owned tool (see Tooling Agreement).</td>
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<td>7.6.1 Measurement systems analysis</td>
<td>The analytical methods and acceptance criteria used shall conform to those in customer reference manuals on measurement systems analysis. Other analytical methods and acceptance criteria may be used if approved by the customer.</td>
<td>Use the AIAG Measurement Systems Analysis manual for guidance.</td>
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<td>7.6.3.2 External laboratory</td>
<td>External/commercial/independent laboratory facilities used for inspection, test or calibration services by the organization shall have a defined laboratory scope that includes the capability to perform the required inspection, test or calibration, and there shall be evidence that the external laboratory is acceptable to the customer.</td>
<td>Where PACCAR specifies specific test laboratories, they will be included in the controlling engineering specification. Otherwise, the supplier is responsible for qualifying their internal or external inspection and test laboratories. Results may be required for submission with the PPAP package.</td>
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<td>8.2.3.1 Monitoring and measurement of manufacturing processes</td>
<td>The organization shall maintain manufacturing process capability or performance as specified by the customer part approval process requirements. The plans shall be reviewed with and approved by the customer when so required.</td>
<td>See PACCAR PPAP requirements for special characteristics requirements. (section 5.2)</td>
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<td>8.2.4.1 Layout inspection and functional testing</td>
<td>A layout inspection and a functional verification to applicable customer engineering material and performance standards shall be performed for each product as specified in the control plans. Results shall be available for customer review. Note: Layout inspection is the complete measurement of all product dimensions and features shown on the design records</td>
<td>See PACCAR Annual Validation requirements 4.8.</td>
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<td>8.2.4.2 Appearance items</td>
<td>For organizations manufacturing parts designated by the customer as &quot;appearance items&quot;, the organization shall provide: - Appropriate resources, including lighting for evaluation - Masters for color, grain, gloss, metallic brilliance, texture, distinctness of image (DOI), as appropriate - Maintenance and control of appearance masters and evaluation equipment, and - Verification that the personnel making appearance evaluations are competent and qualified to do so.</td>
<td>Where the manufacturing processes or environment could affect the appearance of a class A or B surface, the organization must implement process controls and measures to prevent defects identified in the FMEA and control plan. Division Engineering may require VQA samples as noted on prints.</td>
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<td>8.3 Control of nonconforming product</td>
<td>The organization shall deal with non-conforming product by one or more of the following ways: a) By taking action to eliminate the detected non-conformity b) By authorizing its use, release or acceptance under concession by a relevant authority and, where applicable, by the customer c) By taking action to preclude its original intended use or application.</td>
<td>For action b), Division Engineering may issue a written deviation to a non-compliant drawing requirement for a limited-time period.</td>
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<td>8.5.2 Corrective action</td>
<td>Corrective actions shall be appropriate to the effects of the non-conformities encountered. A documented procedure shall be established to define requirements for reviewing non-conformities (including customer complaints). A containment response is due within 24 hours of notification, and short-term corrective actions are due in three days. Long-term corrective action is due in 10 days unless an extension is approved by PACCAR Quality. Referred to as 24/3/10 plan. Corrective actions must be tracked and closed in less than 30 days or by the SQM approved deadline.</td>
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<td>Annex A Control Plan</td>
<td>Prototype: a description of the dimensional measurements, material and performance tests that will occur during building of the prototype. The organization shall have a prototype control plan if required by the customer.</td>
<td>If a prototype control plan is required, the PACCAR Division will so specify during the development cycle.</td>
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