Supplier Handbook
### Cummins Supplier Handbook

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Cummins Supplier Quality Improvement Program

The Cycle

PPAP
APQP
ISO/TS
Supplier Selection

Maintenance
Continual Improvement
A. Purpose

Bought out finished and purchased material make up over 70% of the total cost of the Cummins finished product. Therefore it is essential to have clear, documented requirements and interaction processes between Cummins Inc. and its direct suppliers.

This Handbook communicates Cummins Inc.’s Customer Specific Quality requirements and expectations to Cummins’ direct material suppliers. These requirements and expectations are known as the Supplier Quality Improvement Program Cycle (SQIP), which is depicted in the logo on the previous page.

B. Intent

The SQIP Cycle was developed with three basic principles.

1. Incorporate quality as one of the key considerations in new supplier selection
2. Assure that quality tools and processes are utilized by suppliers in the development of, and revisions to their products and processes
3. Provide a framework for sustaining and improving the quality of supplier products and processes

C. Scope

This Supplier Handbook applies to all suppliers of direct material to Cummins Inc.

D. Cummins Inc. Supplier Code Of Conduct

Cummins values its global supply partners who share the Company's commitment to quality and low cost, and who operate under a philosophy that focuses on integrity and "doing the right thing."

To that end, Cummins has developed and implemented of a code of conduct specifically for its global supply base, detailing the Company’s expectations of compliance to certain business and ethical standards. The code is designed to ensure the Company's suppliers not only adhere to those standards but also to the laws of their countries and all other applicable laws, rules and regulations.

The code applies to all businesses that produce goods or provide services for Cummins and any of its subsidiaries, joint ventures, divisions or affiliates.

The code covers 14 main topics including equal employment opportunity and treatment of others, the environment, forced and child labor, wages and hours, working conditions, freedom of association, political activity and bribery/corruption of government officials. Ultimately, compliance to Cummins Supplier Code of Conduct will be required to do business with Cummins.

The Cummins Inc. Supplier Code of Conduct can be found at www.cummins.com or in the Cummins Supplier Portal www.supplier.cummins.com under the heading Corporate Responsibility.
E. Acronyms and Definitions

Cummins Inc. and industry standard acronyms are used throughout the Supplier Handbook for brevity.

1. **AIAG** - Automotive Industry Action Group is an industry organization that, among other responsibilities, provides administrative support to the Automotive, Truck and Heavy Equipment industries for supplier quality requirements, and distributes related manuals and publications.

2. **APQP** - Advanced Product Quality Planning is a structured process for producing a quality plan, which supports the development and production of a product that will satisfy the customer. Reference the AIAG manual (Advanced Product Quality Planning and Control Plan - APQP<sup>®</sup>) for a complete description.

3. **BU** – a specific Business Unit within Cummins Inc.

4. **Component Certification** – A process whereby the supplier certifies, in some cases with measurement data, that components are within specification.

5. **Cummins Seven Step Problem Solving** - A disciplined method for problem solving which emphasizes analysis for the true root cause and verification that the corrective action is effective in eliminating the root cause. The Seven Steps in the process are:
   1) Identify the Problem
   2) Determine and Rank Potential Root Causes
   3) Take Short Term Action and Containment
   4) Gather Data and/or Design Test
   5) Conduct Tests, Analyze Data, Identify Root Cause(s), Select Solution
   6) Plan and Implement Permanent Solution
   7) Measure, Evaluate and Recognize the Team.

   This process has been adopted by the AIAG Truck & Heavy Equipment Group as its preferred approach to problem solving.

6. **Classification of Characteristics (C of C)** - The process of classifying product and process characteristics for the optimum utilization of engineering, manufacturing, and supply base resources. In TS16949 terms these are Customer Designated Special Characteristics. C of C has four types of characteristic:
   a. **Critical Characteristic** - A dimension, material property, physical feature, etc. which, if not to specification could be a safety risk, or will certainly cause operational failure or a loss of performance.
   b. **Major Characteristic** - A dimension, material property, physical feature, etc. which if not to specification will probably cause operational failure, loss of performance, increased service cost or disruption to manufacturing.
   c. **Minor Characteristic** - A dimension, material property, physical feature, etc. which has not been classified as Key, Critical or Major. It exists only as a general class to describe characteristics that do not fit other classifications. Although not classified as Critical, Major, or Key the supplier is responsible for ensuring these characteristics meet the print specification. Cummins Turbo Technology calls these Standard Characteristics.
   d. **Key Characteristic** - A dimension, material property, physical feature, process, etc. that has been identified as being key to subsequent manufacturing or assembly operations. Key characteristics may be identified by the SQI Engineer. Key characteristics apply predominantly to minor characteristics.
   e. **Six Sigma Characteristic** – A dimension, material property, physical feature, process, etc. that has been identified as being important to be monitored during manufacturing of the component. This characteristic would have not been extracted by FMEA or DVA, but will be engineering judgment to be critical for application. This characteristic may also be identified by SQIE.

Classification of Characteristics is intended to serve as a guide for the development of supplier process quality plans - not to relieve suppliers of the responsibility to produce all features to specification.
7. **Direct Material** - Components and assemblies used in Cummins’ production processes that become part of the salable product. They are typically included as a Bill of Material item.

8. **Direct Part Marking** – Defined by engineering standard CES 18287 which prescribes methods for bar-code identification (1D, 2D, etc) on required products.

9. **DQR** – Drawing Quality Review - A detailed cross-functional review of each drawing which ensures that the component is producible to the specification, drawings are accurate and complete, and suitable for PPAP (when applicable), prior to final release of the drawings.

10. **FIRG** – Failure Incidence Review Reporting Group

11. **In-plant Defect PPM** - The number of parts with supplier-caused defects found within a Cummins facility versus the number of parts received from that supplier by the Cummins facility, reported as parts per million (PPM) on a monthly basis.
    a. NOTE: For suppliers with multiple producing locations, each producing location will be considered separately.

12. **iSCM** – A supplier portal used by some Cummins Inc. BU’s. Engine Business suppliers are required to register in iSCM.

13. **ISIR** – Initial Sample Inspection Report


16. **LPA** – Layered Process Audit

17. **MSA** - Measurement System Analysis – a process to determine that measurement systems are capable of measuring to the desired accuracy and repeatability. Reference the AIAG manual *(Measurement System Analysis - MSA)* latest edition for a complete description.

18. **MQV** - Manufacturing Quality Verification – a process used by Cummins and Cummins’ suppliers to reduce defects sent to customers by looking at FMEA findings and historical data, such as OEM defects, warranty, and customer touch points, and ensuring that steps have been taken to prevent these defects from reaching our customers. Steps can include, but are not limited to, design changes, process design changes, and fail-safing.

19. **NCMR** – Nonconforming Material Report

20. **OEM** – Original Equipment Manufacturer

21. **OEM Defect PPM-Supplier** - The number of Supplier Caused OEM defects divided by the number of units shipped expressed in parts per million (PPM).
    a. NOTE: For suppliers with multiple producing locations, each producing location will be considered separately.

22. **PCC** – Production Capability Certification – Cummins verification that supplier production capability and readiness will meet full production timing and volumes sometimes also know as run at rate. The intent is to identify manufacturing problems prior to full production that typically don’t become evident until full production runs are initiated. The process is also used to verify supplier capacity.
23. **PCM/VPCR** - Product Change Management is the system through which Cummins typically controls changes to existing product. A Value Package Change Request is the Cummins document that details the specifics of and approvals for the individual changes.

24. **PPAP** - The Production Part Approval Process is the process used to ensure new or changed components meet Cummins quality requirements. It is often used in conjunction with APQP. No new or changed parts can be shipped to Cummins before a PPAP is approved by a Cummins SQIE. Reference the AIAG manual *(Production Part Approval Process – PPAP)* for a complete description.

25. **Quality System** - Third Party Registration - Certification by an independent registrar which is qualified by a national accreditation body to perform audits to an accepted standard such as ISO/TS 16949:2009 and ISO9001:2008 and to register the audited facility for a given scope.

26. **RPS** – Rapid Problem Solving process

27. **SCAR** – Supplier Corrective Action Request

28. **SCR** – Supplier Change Request – process suppliers are required to use to request approval of a change to a product or process. This process may also be referred to as Product Change Notification (PCN) in some business units.

29. **SIP** – Supplier Improvement Process

30. **Six Sigma** - Statistically based improvement process used throughout Cummins. Suppliers will be requested to participate where significant opportunities for improvements are identified.

31. **Source Release** – Process for ensuring the quality of non-PPAP approved components. Requirements include, but are not limited to: Record of Conformance, 3 Piece full dimensional layout, SPC or 100% inspection of classified characteristics, material/performance test results, and Prototype Data Report (PDR) requirements when requested. This is a batch approval process that must be completed prior to each shipment and is used exclusively as part of a VPI program.

32. **SQIE** - Supplier Quality Improvement Engineer is the person(s) at Cummins responsible for the ensuring suppliers execute various elements of the SQIP such as APQP, PPAP, and SCAR’s.

33. **SQIP** - Supplier Quality Improvement Program is the Cummins term for the process to be followed by Cummins SQIE’s with suppliers of direct materials. This is also referred to as the Cycle in this Handbook.

34. **Supplier Scorecard** - A Cummins purchasing system that rates the supplier in the categories of Price/Cost, Quality, Delivery, Technology, and Attitude/Administration.

35. **TCO** – Total Cost of Ownership, A cost modeling tool that systematically accounts for all costs related to purchasing decision. TCO evaluates all costs, direct and indirect, incurred throughout the life-cycle of an item, including acquisition and procurement, operations and maintenance, and end-of-life management. Sum of all expenses/costs associated with the purchase and use of equipment, materials and services.

36. **VPI** - Value Package Introduction is the Cummins process for new product introduction. This process is the vehicle through which Cummins satisfies the requirements of APQP.
F. Prohibited and Restricted Materials Requirements

Consistent with its commitment to contribute to a cleaner, healthier, safer environment, Cummins Inc. has identified substances that are restricted or prohibited from our products. Consequently, suppliers must be aware of and adhere to these standards for materials or components supplied to Cummins.

Materials provided by suppliers may include partially or fully finished assemblies, components, packaging, chemicals and consumable processing materials. It is the responsibility of the supplier to verify that the substances listed are not in any products or materials supplied to Cummins per the referenced threshold. The prohibited and restricted materials guidelines are available on the supplier portal www.supplier.cummins.com by following the path Environmental Stewardship>Environmental Standards>Prohibited Materials.

G. Quality System Requirements

1. A quality system is an integral part of a successful quality program. It is not, however, a guarantee of quality products and processes. A quality system establishes disciplines. Only when the disciplines are in place and effectively executed will the benefits be derived. Functioning quality systems lead to sustained improvements within an organization.

2. Supplier quality system requirement by Cummins Inc.:

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<tr>
<td>Cummins Inc.</td>
<td>All Direct Material Suppliers</td>
<td>All Applicable Suppliers (3)</td>
<td>By Approval Only (1)</td>
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NOTE 1: Cummins Inc. will allow no exceptions for suppliers who ship products to Cummins Inc. plants who are ISO9001:2008/TS16949:2009 registered. While Cummins would like all suppliers to be ISO9001:2008 certified, exceptions for suppliers who ship to plants which are not TS16949 certified exceptions are allowed, see NOTE 2.

NOTE 2: The minimum acceptable quality system registration for a new supplier is ISO9001:2008 unless written approval of exception is given by the applicable Cummins Purchasing Quality Leader. Similar approval is required for the use of any supplier who is not ISO9001:2008 registered (see Note 1).

NOTE 3: All suppliers who meet the AIAG applicability rules for becoming an ISO/TS16949 supplier shall pursue certification. In the meantime, as a minimum, these suppliers shall follow PPAP and APQP rules and all requirements listed in this manual.

NOTE 4: Suppliers who are not registered to ISO9001:2008 must have systems in place to ensure they meet Cummins Quality, Cost, and Delivery needs.

3. The supplier shall maintain their Quality System Registration through their registrar’s surveillance program and will notify the Cummins SQIE of any change in their registration status such as a new certificate number, suspension, revocation or switch to another registrar. The supplier must submit a copy of their registration to Cummins Inc.

4. Cummins expects its Tier 1 suppliers to manage the quality of their supplier base. Cummins understands that Cummins Tier 1 suppliers must occasionally use suppliers who are not ISO9001:2008 registered due to factors such as supplier size, volume, specialty products, etc.. Cummins does not prohibit the use of these suppliers.

5. Cummins requires that Cummins Tier 1 suppliers allow and facilitate Cummins visits and audits of Tier 2 suppliers if requested.
6. Any change from one supplier to another (including change in supplier site) requires the change be approved through the use of the Cummins Supplier Change Request process (ref. M. 2 3).

7. Where Cummins purchases “Off-The-Shelf” items (e.g. items that are commercially available, purchased from a store, or catalogue, are not supplied to a Cummins TS16949 registered plant, and are not purchased based on a Cummins print) no quality registration requirements are invoked.

8. ISO/TS 16949 and ISO9001:2008 contain numerous clauses such as “…when required by the customer” or “…where specified by the customer.” The Cummins Supplier Handbook is Cummins repository for these requirements. All items in this Cummins Supplier Handbook shall be considered Cummins’ “customer requirements”.

9. It is impossible to cover every conceivable situation with a blanket statement or definition. If a situation occurs that is not covered by the Cummins Supplier Handbook, the Cummins SQIE is the main point of contact for getting questions answered and situations resolved. The Cummins SQIE has the authority to request data above & beyond the stated requirements in the Cummins Supplier Handbook if it is deemed pertinent to protect the interests of Cummins, Inc.

H. Continual Improvement

1. Cummins expects suppliers to monitor the outputs of their quality system and continually improve in quality, service, and cost. This philosophy should be fully deployed throughout the supplier’s organization. Continual improvement in product characteristics means optimizing at a target value and reducing variation around that value. This assumes that product characteristics currently meet specifications. Cummins customers have high expectations of the quality of the Cummins products. In order to meet these expectations we are equally demanding of our supply base.

2. Suppliers are also expected to apply continual improvement techniques to non-product characteristics that impact quality, service, and cost such as machine downtime; floor space utilization; first-time PPAP approvals; testing methods; process flows etc. Lean manufacturing methods are a proven way of achieving these improvements and are encouraged by Cummins, Inc.

3. Suppliers are encouraged to adopt Six Sigma as a formal improvement process, particularly when aimed at improving quality or reducing costs.

4. Suppliers with high value, chronic or repeat quality issues need to participate in a Cummins driven problem solving initiative.

5. Suppliers are expected to implement Cummins Manufacturing Quality Verification (MQV) tool as part of their continual improvement process when directed by their SQIE or as part of APQP during a VPI program. MQV is a tool for identifying past and potential defects and ensuring that those defects cannot reach Cummins or its customers. Cummins uses MQV as an APQP tool and as a tool to drive continual improvement.

6. Suppliers shall use statistical tools for managing and improving processes as requested by the Cummins SQIE. Statistical tools may include but are not limited to Statistical Process Control.

7. Suppliers shall comply with continual improvement methods such as Annual Layout and Layered Process Audit (LPA) as requested by Cummins.
8. For electronics components, supplier is expected to evaluate the manufacturing process for the application of Process Average Testing (PAT). This should be discussed with the Cummins SQIE for appropriate application of PAT.

I. Supplier Selection

1. For potential suppliers to Cummins, the selection team from Cummins Inc. will assess the supplier against specific requirements including Quality, Total Cost of Ownership (TCO), Technical, Regulatory, Financial, Warranty Commitment, Target Cost and Future Cost Reductions.

2. As a supplier or potential supplier you will be asked for a copy of your ISO/TS 16949 or ISO9001 certificate which covers the producing plant location and product proposed for delivery to Cummins.

3. Additionally, you will be asked to complete a Supplier Selection Checklist as a prelude to a site visit by the selection team. During the site visit, qualified members of the selection team will perform a Supplier Selection Checklist Audit and/or a Focused Cummins Quality System Assessment. The selection team will be comprised of representatives of engineering, manufacturing, purchasing, quality and finance. The Supplier Selection Checklist audit looks at many of the supplier’s systems in detail with the objective of determining which areas need to be improved prior to launching a Cummins product at that facility. The Focused Cummins Quality System Assessment, rather than looking for the presence of an entire quality system, focuses on the effective implementation of the system and looks for evidence of routine execution.

4. Process/Product audits of similar products being run on the process proposed for Cummins may also be included as part of the Supplier Selection Process.

5. When the selection team completes their evaluation and a selection is made, the new supplier is formally introduced into the SQIP Cycle.

6. Suppliers which sell $5 million to Cummins in a country of import shall have a resident technical resource to handle sorting, screening, and issue resolution. Suppliers which sell less than $5 million dollars to Cummins in a country of import shall use a third party for these types of activities at the supplier expense. Special arrangements can be made between the Cummins Inc. Plant and the supplier at the request of the Cummins plant or Cummins purchasing. In some cases, suppliers which sell less than $5 million to Cummins in a country of import may be required to have a resident technical resource.

J. Design Control

Design control refers to the ‘ownership’ of the design of the component being sourced.

a. Cummins Design Control – the component is wholly designed, developed and specified by Cummins. Suppliers are encouraged to participate in the design of these products to contribute their knowledge and expertise (e.g. process requirements, cost reduction opportunities etc.). If a component is under Cummins design control, it is Cummins’ responsibility to address quality issues arising from the design.

b. Supplier Design Control – the component is wholly designed and developed by the supplier to meet a Cummins specification, performance requirement, and technical profile. If a component is under the Supplier’s design control, it is the supplier’s responsibility to address quality, reliability, and durability issues arising from the design.

i. The supplier is responsible for completing Design Failure Mode Effects Analysis, Design Reviews, and specific product testing that demonstrates compliance to expected reliability and durability (life).
1. The requirement of APQP is crucial to the development of new products and processes, the revision of existing products and processes, and moving components from one supplier to another. Its single most important tenet is that quality does not just happen, it must be planned. Quality must be in the design of the product as well as in the development of the process that will produce the product. Three key outputs of APQP are the Process Failure Mode and Effects Analysis, Control Plan, and PPAP. Suppliers are expected to be knowledgeable of and follow the APQP process.

2. As a supplier to Cummins you should be aware that at least two APQP processes happen in conjunction with one another:
   a. Cummins initiates an APQP process internally in the development of new products (through VPI); and,
   b. As a supplier of a component or assembly to the new Cummins product, you shall initiate an APQP process of your own when engaged by Cummins. Your level of involvement will vary depending on where the responsibility for design control resides for the component or assembly that you will be supplying.

   Note 1: Cummins Inc. New Product Introduction Process, known at Cummins as Value Package Introduction (VPI), contains some Cummins-specific requirements not explicitly defined in APQP. You will be made aware of the additional requirements as you are engaged in the VPI process by the Cummins SQIE. Required task completion dates will be assigned and monitored by the Cummins SQIE.

   Note 2: Suppliers are required to utilize the APQP process regardless of the risk of their particular process. The level of oversight will vary depending on risk.

   Note 3: Suppliers providing prototype components to Cummins as part of a VPI program are required to comply with source release requirements prior to shipment of any material to Cummins, Inc.

3. Each supplier participating in a New Product Introduction (VPI) project must be able to provide evidence of meeting our APQP checklist requirements for their component. APQP is applicable to VPI components, the revision of existing product designs, and to source changes (moving a component from one supplier to another). Some APQP elements need not be re-developed in every case. If the supplier and the Cummins SQIE determine that an APQP element is not affected by the change, no action is required other than documenting the consideration. If an element is affected by the change, prior work is updated accordingly.

4. The Cummins SQIE will engage a supplier for APQP activity with required task completion dates at the appropriate time in the Product/Process development cycle.

5. Cummins requires suppliers with projects deemed as high risk to participate in the Cummins Safe Launch process. This may apply to new components, changes from one supplier to another, and for some component design or process changes. Suppliers expected to complete this activity will be notified by their Cummins SQIE. Safe Launch includes but is not limited to:
   a. Production Capability Certification (PCC Run) – test of capacity and quality run by the supplier with Cummins personnel present. Similar to “run at rate”.
   b. Source Release – a process for ensuring non-PPAP approved parts meet quality requirements
   c. Component Certification – a process whereby the supplier certifies, in some cases with measurement data, that components are within specification. Requirements for Component Certification will be identified by the Cummins Inc. receiving plant.
   d. Preliminary/Inspection Control Plan – detailed plan for increased inspection frequencies during the safe launch timeframe.

6. Where electronic systems are available, suppliers are required to use these systems for submission of APQP and PPAP documentation. Please contact your SQIE for details.
7. Cummins Inc. has developed a formal APQP review process. This review process brings the supplier’s management, Cummins Inc. plant management, engineering, purchasing, and others together at different stages of the APQP process to review status of APQP activities associated with a specific component. Cummins Inc. suppliers shall participate in Cummins Inc. formal APQP process as requested by their Cummins Inc. SQIE contact.

L. PPAP

1. PPAP (Production Part Approval Process) is a basic element of the Cycle. PPAP applies to both new and existing product and is intended to assure that the new or revised products and processes are production ready. PPAP can be the end result of APQP or a process in its own right to manage smaller changes. Regardless of whether Cummins initiates a new or revised component design, or whether the supplier initiates a change to an existing component or process, a PPAP must be approved by Cummins SQI prior to production parts being shipped from the supplier to Cummins. Suppliers must be knowledgeable of and follow the AIAG PPAP process.

2. Cummins requires suppliers to follow the latest version of the AIAG PPAP manual. Suppliers must obtain written approval from Cummins for product or manufacturing process changes before shipment of components to Cummins (ref M2, a-e). Unapproved changes cause serious issues often in spite of the fact that they were made by the supplier with the best of intentions. Cummins must be notified of pending changes using the Cummins Supplier Change Request Process (SCR). Informed decisions are then made on the impact of the changes and whether a full, partial, or no PPAP submission is required. It is the supplier’s responsibility to ensure that Cummins has approved the PPAP before any parts are shipped to a manufacturing location.

NOTE 1: Some Cummins locations may batch certain changes and approve on a calendar basis (e.g., twice yearly).

3. Cummins-specific PPAP information is detailed here:
   a. Where the PPAP manual states “...contact the customer” or “...contact the customer product approval activity” that person is the SQIE at Cummins.
   b. PPAP Interim Approvals may be utilized throughout the prototype and pre-launch phases of VPI, however, only the Cummins SQIE can make the decision to approve a PPAP as interim. Suppliers should always strive for full approval. Interims should be the exception.
   c. The Submission Level (1 through 5) required by Cummins is defined by the SQIE for each PPAP submission.

      NOTE 1: A Level 5 submission may include supplier site activity such as a Process/Product Audit or other means of verifying the capability of the production system in addition to the onsite completion of the PPAP
      NOTE 2: Per AIAG manual, the supplier must complete all elements of a PPAP regardless of the submission level chosen, unless specifically waived in writing or via electronic system by Cummins SQIE.
      NOTE 3: In cases where PPAP volumes are very low, a “Special Level 4” PPAP may be utilized. Reference section J.3.I.
      NOTE 4: You must get approval from your Cummins SQI engineer to use this variation.
   d. Three sample parts are the default requirement for dimensional verification with some customers requiring more than three samples. The Cummins SQIE will notify the supplier if other than three sample parts are required. Dimensional verification requires a full layout of all dimensions,
specifications, and notes on a drawing unless previously agreed upon with the Cummins SQIE. Cummins subscribes to the AIAG requirements regarding dimensional results for each manufacturing process. (e.g. Cells or production lines and all cavities, molds, patterns or dies)

e. Cummins subscribes to the Truck OEM Specific Instructions defined in the PPAP manual.

f. Whenever a Cummins Engine Business Unit drawing references Cummins Engineering Standard 10,012, Source Approval, all changes, regardless of their nature must be reviewed by Cummins engineering. Cummins engineering will determine the level of testing required prior to making the change. Tests may be performed by Cummins, the supplier or a combination of both. The supplier has the obligation for maintaining evidence of the test results (regardless of who performed the tests) per the PPAP requirement “Material, Performance Test Results”, and for evidence of Cummins Engineering approval(s) per the PPAP requirement “Engineering Approval.”

   NOTE 1: Some Source Approval testing may extend beyond the need date for production parts. In these cases, Cummins Engineering may authorize PPAP Interim Approval until the testing has been satisfactorily completed. Cummins Product Engineering must approve interim PPAP's for all components that have not completed source approval testing.

   NOTE 2: Other, non-Source Approval functional, material or performance testing which is required on the drawing falls under PPAP element “Material, Performance Test Results.”

g. The AIAG PPAP manual refers to customer’s “Special Characteristics.” Special characteristics at Cummins are indicated on Engineering drawings with the following symbols:

<table>
<thead>
<tr>
<th>Characteristic Type</th>
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<td></td>
<td>Critical</td>
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<td></td>
<td>Major</td>
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<td></td>
<td>Key</td>
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<td></td>
<td>Significant Minor</td>
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<tr>
<td></td>
<td>Six Sigma</td>
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Special characteristics are to be documented in the “Initial Process Study” of PPAP.

   Note 1: Key characteristics can be identified on the print or may be identified by the Cummins SQIE. (ref item K.3.h.)

h. In addition to these Critical and Major drawing characteristics, the Cummins SQIE may specify other characteristics as KEY characteristics for process control purposes. These Key characteristics are to be documented the “Initial Process Study” of PPAP.

i. Unless otherwise directed by the Cummins SQIE, all Critical, Major, and Key characteristics are to be statistically studied and included in PPAP “Initial Process Study.” In general, Cummins requires a Capability or Performance Index greater than or equal to 1.67 as acceptance criteria for initial short term studies on Critical, Major and Key characteristics.

   NOTE 1: It is important to consult the Initial Process Studies section of the PPAP manual for the discussion on stability and acceptance criteria for initial studies. Per these discussions, initial study acceptance criteria of quality indices between 1.33 and 1.67 may require some improvements after careful review of the data.

   NOTE 2: When estimated annual usage is less than 3600 pieces, refer to the Truck Industry-Specific Requirements of the latest revision of AIAG PPAP Manual. These instructions define a minimum sample size, two Control Plan options, two initial short-term statistical study options and initial short-term study acceptance criteria. Cummins subscribes to these Truck OEM-Specific Instructions. When usage is over 3600 pieces, a 300-piece run, with 100 of the 300 used for statistical analysis is required. High Volume PPAP’s will not be fully approved without sufficient data. The Cummins SQIE and the supplier will agree to the requirements per these instructions. A 30-piece machine study is NOT appropriate for PPAP approval.
Note 3: In cases where volumes are extremely low and statistical analysis of data impractical (e.g. normal manufacturing runs of less than 30 pieces and total yearly volume of less than 500 pieces) the supplier, upon agreement with the SQIE, may use a Special Level 4 PPAP. This variant of the AIAG PPAP process is a Level 4 PPAP that requires a warrant, a control plan including set-up control, layout, material certification, and inspection information. All other PPAP requirements are waived. Special Level 4 PPAP’s are intended only for those components with such low volumes that statistical information is invalid. All other PPAP’s should follow the standard or truck PPAP requirements of AIAG.

Note 4. PPAP’s for Standard Products, products that are ordered from a catalogue (e.g. grade 8 bolts), are requested at the discretion of the Cummins SQIE. Where PPAP is required, all rules of PPAP apply.

Note 5. “Off The Shelf” components, which are very low volume components from suppliers in industries that do not use the PPAP process (e.g. specialty gauges for the marine business) do not require PPAP’s. These suppliers usually replace any defective components at no charge to Cummins.

j. While statistical studies are specified on Critical, Major and Key characteristics, this does not mean that the other characteristics on Cummins Engineering drawings may be ignored. All characteristics must meet specification and it is in the supplier’s best interest to understand their capability on ALL features. All Significant Minor and Six Sigma characteristics are to be studied using a minimum 30 piece sample and must demonstrate a capability or performance index of 1.0.

k. The Dimensional Results section of PPAP is where these characteristics are reported for the number of Sample Product required.

l. Process Flow Diagrams, PFMEA’s and Control Plans shall use a process numbering scheme or sequencing method that is consistent to ensure traceability to each document.

m. Cummins Inc. suppliers must have the ability to submit PPAP documentation electronically. Documentation submission requirements will be defined by the Cummins Inc. SQIE and may vary by business unit.

n. Cummins’ drawings state specific Engineering, Material, Process, Inspection standards and product notes that are required to enable the supplier to manufacture the part. Compliance to these standards and notes shall be confirmed in writing by the supplier during the PPAP process. The supplier may use the dimension report/ISIR and material/performance documents to record their compliance statements.

o. Current Calibration records are required for all gages/measurement equipment used to inspect Cummins product. Measurement Systems Analysis (MSA) is required for any measuring equipment used to inspect the special characteristics identified on the Cummins drawing or as defined by the Cummins SQIE. The Anova method, as detailed in MSA 4th edition is the preferred method for submittal to Cummins. MSA acceptance limits shall be as follows:

1. P/T Ratio (Precision to Tolerance)
   a. P/T Ratio is less than 10% is acceptable
   b. P/T Ratio between 10 and 30% is marginally acceptable
   c. P/T Ratio greater than 30% is unacceptable.

2. R&R (Repeatability and Reproducibility)
   a. R&R less than 10% is acceptable
   b. R&R between 10% and 30% is marginally acceptable
   c. R&R greater than 30% is unacceptable.
M. Non-conforming Material

1. In the event that quality problems are experienced with a supplier, Cummins’ corrective action process may escalate through several phases depending on the adequacy and timeliness of the supplier’s response and the effectiveness of the actions taken. It may also go straight from problem notification to Senior Management depending on severity and urgency.

   a. Note 1: Reworked or repaired material is considered non-conforming unless prior approval of these processes was granted by the Cummins SQIE and appropriate Cummins Engineering resources.

2. Cummins will notify the supplier when a nonconformance has occurred. At the time of notification, the supplier will also be advised if a corrective action response is required.

   a. If requested, the supplier will complete the Cummins Seven-Step Problem-Solving process.
   b. If an NCMR is issued but a SCAR is not, it is Cummins expectation that the supplier takes immediate action to contain any additional defects and while no formal response is required in this case, the supplier is still expected to take appropriate corrective action to prevent additional defects from being produced or reaching the Cummins site. Cummins SQIE’s may check supplier’s actions taken as part of the Cummins Process/Product audit process.
   c. The NCMR gives the supplier the opportunity to document actions taken and Cummins suggests that the supplier document these actions. In some cases, a Cummins plant may request that the supplier respond to an NCMR. If response is requested, the supplier is expected to comply.
      i. NOTE: Reference the AIAG manual (Seven-Step Problem-Solving Process for Truck and Heavy Equipment Suppliers) for recommended methodology.
      ii. NOTE: If the supplier has institutionalized a different problem solving methodology (e.g., 8D) that is proven to be consistent with the intent of the Cummins Seven Step, the supplier’s response may be accepted using their format.

3. If a SCAR (Supplier Corrective Action Request) is issued, the following must take place:
   a. Supplier is required to take immediate containment actions to enable Cummins facilities to operate and protect Cummins from further non-conforming product.
      i. The supplier shall submit documented containment results within 24 hours of notification of non-conformity.
      ii. The supplier’s containment process must cover all possible areas of potential defects including:
         1. Supplier’s manufacturing location
         2. All potential transportation links (e.g. supplier to ship, ship to warehouse, warehouse to Cummins, etc.)
         3. All warehousing operations from the supplier through the Cummins facility
         4. The notifying Cummins facility and any other potential Cummins facilities
         5. AIAG inventory containment form shall be submitted to Cummins Inc to document containment has taken place at all possible inventory locations.
   b. Root cause shall be identified and short term action in place within 48 hours of finding the defect. If a part is "required" to complete the root cause analysis, the 48 hours begins when the supplier receives the part. However, all attempts shall be made to complete the root cause analysis without having component physically in hand. Photographs, measurement data, and defect descriptions are usually sufficient for this purpose.
   c. Long term action plan submitted within 10 working days of receipt of SCAR
   d. Long term action plan in place within 30 days of finding the defect. Past Due SCARs will be escalated to Cummins, Inc. management for further review.
      i. Timeliness of suppliers’ responses to these due dates are measured and included in the Supplier Balanced Scorecard.
e. Cummins reserves the right to institute third party sorting/certification of product at the Suppliers location if a Supplier Corrective Action is inadequate or in the case of a recurring defect. Any charges accrued associated with the activities conducted by the Third party will be at the Supplier’s expense.

f. Suppliers are required to use the systems specified by their Cummins SQIE to respond to NCMR’s and SCAR’s.

g. PFMEA and Control Plan are to be reviewed and relevant revisions made as part of the problem solving process. The expectation is that these documents will be submitted as part of the completed SCAR response. Proprietary process documentation requires evidence that the review has been completed by the Cummins SQIE. Process changes as a result of the problem solving process are expected to be submitted to Cummins for review using the SCR process and PPAPs completed where required.

4. All SCAR responses will be reviewed by appropriate Cummins quality personnel (e.g. SQIE) for adequacy. Suppliers are expected to submit evidence of problem solving tools used during root cause investigation of the issue. These include but are not limited to: 3P-5Why, Cause & Effect Matrix, Fishbone Diagram, etc. Unacceptable responses will be returned to the supplier for further work.

5. Repetitive nonconformance, adverse quality trends, or other issues may escalate the corrective action process to include, but not be limited to:

   a. Formal Process/Product Audit of the supplier’s facility by Cummins Supplier Quality, looking for systemic issues.

   b. Focused problem solving activity with agreed measures and targets and routine progress reporting into Cummins.

   c. Submission of capability information on selected characteristics

   d. Submission of Paynter Charts tracking defects and Step 3 and Step 6 action monthly

   e. Participation in 6 Sigma projects

   f. Participation in a formal Cummins Supplier Improvement Process program (SIP)

   g. Participation in Controlled Shipping/Consequential Management activities, which may include Third Party containment/component certification processes that are provided at supplier’s expense. These actions will be implemented at the direction of Cummins Purchasing Supplier Quality Leader.

   These activities will be monitored at a senior level at Cummins and require the active participation of senior management at the supplier.

6. The final escalation of the corrective action process, if required, is a meeting of the supplier’s highest management with appropriate Cummins’ Plant, Purchasing or Corporate senior management. The supplier must be prepared at this meeting to commit resources to resolve the issues. Failure to follow through with these commitments would initiate re-sourcing activity by Cummins.

7. Cummins monitors supplier-caused disruption costs to Cummins and its Customers. Costs associated with supplier caused disruptions will be recovered from the supplier. Typically these costs could arise from:

   a. Nonconforming material detected within Cummins or by its customers

   b. Supplier caused warranty issues

   c. Line stoppages at Cummins or its customers due to supplier issues

   d. SQI work beyond normal planned activity
N. Maintenance and Improvement

The Maintenance element perpetuates the Cycle and establishes on-going updates and monitoring of Cummins’ relationship with the supplier. This element contains both Cummins and supplier responsibilities.

1. Process/Product Supplier Change Control

a. The supplier shall notify the Cummins SQIE of any proposed process or product changes as described in the AIAG PPAP manual. Failure to adhere to PPAP notification rules have led to severe quality issues.

b. The supplier shall obtain approval for all process and product change requests from their Cummins SQIE prior to implementing a change. Proposed changes shall be approved using the Cummins Supplier Change Request Process (SCR). Informed decisions are then made on the impact of the changes and whether a full, partial, or no PPAP submission is required. **It is the supplier’s responsibility to ensure that Cummins has approved the PPAP before any parts are shipped to a manufacturing location.**

c. Changes to the suppliers direct material supply base require the supplier to submit a Supplier Change Request (SCR). Upon approval of the Supplier Change Request the supplier may be required to submit a PPAP by the Cummins SQIE.

d. The supplier shall gain approval from the Cummins SQIE using the Supplier Change Request process when any alternate process is to be used. **NOTE:** An alternate process is one that is different than the process used during PPAP

e. Products produced on alternate processes may be subject to increased inspection and test requirements as agreed with the SQIE. **In all cases Item 2.d. applies.**

2. Quality Data

a. The supplier shall maintain routine quality data (e.g., quality indices updates, reliability test results, etc.) that are required by the Cummins Engineering drawing, agreed to in the APQP/PPAP elements of the Cycle, or established as part of a corrective action plan. Such data shall be made available to Cummins upon request and provided within 1 business day of such request.

b. The supplier shall maintain on-going capability data for all customer “special” characteristics”. All characteristics identified as major or critical on the print, and any characteristic that has been deemed “key” by the SQIE falls under the category of a customer “special” characteristic. The supplier shall provide capability information available to Cummins within 1 business day of request. In some cases, suppliers will be requested to provide capability on a routine basis (e.g. monthly). The supplier shall comply.

c. Supplier shall perform and maintain results for any required Functional Reliability Verification (FRV) testing that is identified on the component drawing by a functional reliability specification. Functional Reliability verification is intended to be ongoing and conducted by the supplier during the life of a component or sub-assembly to assess the ongoing capability of the component or sub-assembly to meet a functional reliability specification. Possible verification methods include but are not limited to: Fail-safing, in-process checks, process control, dimensional checks, and test-to-failure audit.

d. Cummins will monitor the quality performance of the supplier primarily through In-plant and OEM Defect PPM measures. Cummins will report these measures to the supplier. Zero PPM is the goal for both measures. **Failure to meet this goal may result in**
corrective action activity as described in Section L, Non-Conforming Material. Cummins will set interim goals (targets) for suppliers who cannot immediately meet the zero defect goal. These targets will be reduced each year with the expectation that these suppliers will eventually meet the zero PPM goal.

e. Direct Part Marking (DPM) – Suppliers must familiarize themselves with CES18287 and other applicable Cummins engineering standards as well as AIAG documents referenced within them. It is the direction of Cummins Inc. to have identified components electronically marked with a 2D mark. Suppliers must ensure 100% readability by the receiving Cummins Plant(s), and that they have traceability of each component within their facility’s database. The electronic mark will be part of the PPAP process. It is important that the supplier work closely with the receiving Cummins Plant(s) to ensure readability and traceability. Electronic part marks that are unreadable or missing will be handled as non-conforming material. Each Cummins Plant must be harmonized to accept the same mark from a supplier in the event that a component is a supplier to more than one Cummins plant.

f. Cummins will monitor the reliability performance of selected suppliers’ components (especially suppliers with design control) through Warranty claims per engine, service campaign and temporary repair practice. Cummins will report these measures to the supplier.
   a. The Suppliers must have the ability to submit Failure investigation electronically.
   b. The Supplier shall monitor and participate to reduce field warranty claims. It is important to control problem resolution time in their processes.
   c. In the event a reliability/safety problem results in a recall, the supplier shall work with Cummins to urgently remediate the problem.

O. Perpetuating the SQIP Cycle

1. APQP and PPAP continue to provide inputs to the Maintenance element as new products and processes are developed and existing products and processes are improved. Likewise, Maintenance provides input to future APQP and PPAP projects with information on suppliers’ performance history. Following the elements of the Cycle along with sincere execution of ISO/TS 16949 will promote the upward slope of Continuous Improvement. Supplier performance in all elements of the Cycle will be considered in future sourcing decisions.

P. Other Cummins Supplier Specific Quality Requirements

1. Record Retention
   a. The supplier shall maintain PPAP records for the life of the product plus one year
   b. The supplier shall maintain inspection and test records for three years minimum

2. Access To Supplier Sites
   a. The supplier shall allow on-site verification activities as required by Cummins and Cummins’ customers
   b. The supplier shall allow on-site Process/Product Audits and System Assessments when requested by Cummins
   c. The supplier shall allow and facilitate visits by Cummins Inc. personnel to their suppliers for purposes of audit, PPAP review, APQP review, review of corrective action effectiveness, or any other reason related to the quality of components produced for Cummins.
d. The supplier shall allow direct communication with their manufacturing facility on quality issues.

3. Quotation Criteria
   a. When submitting a quotation, the following criteria shall be addressed:
      i. Clear understanding and agreement on the product specifications, requirements and applications. Supplier is encouraged to seek participation in the Drawing Quality Review (DQR) process to ensure full understanding of Cummins Print requirements.
      ii. Internal capabilities sufficient to manufacture products at consistent, acceptable, quality and performance levels
      iii. Recommendation of any changes that will prove advantageous to product quality, performance, price and delivery
      iv. Notice of any exceptions to be included with quotation bid

4. General
   a. The supplier shall use the AIAG reference manuals for APQP, SPC, PPAP, FMEA and MSA processes.
   b. Supplier shall notify Cummins of any changes within their management structure within two weeks of changes taking effect. This includes changes in ownership as well as any changes to contacts related to doing business with Cummins.
      i. The supplier shall appoint a ‘quality contact’. This individual will be the prime path for communication of these handbook requirements to the supplier’s organization.
      ii. Supplier shall ensure that the contact information in all electronic systems is current. This update shall occur twice a year at a minimum.
   c. The suppliers ‘quality objectives’ shall be in line with Cummins quality objectives, particularly PPM (zero defects), lead-time, and improvement targets
   d. The supplier shall have the ability to communicate electronically with Cummins to address PPAP, SCAR, NCMR, Scorecard, Survey, and Supplier Change Requests.
   e. Any tooling, gauges etc. provided by Cummins shall be controlled within the suppliers system (e.g. for calibration requirements)
   f. The supplier shall have deployed statistical methods to control product features and reduce variation as appropriate
   g. The supplier shall meet Cummins packaging requirements as defined in the Cummins packaging standards titled A. “Production Component Packaging Standards Worldwide Operations”, B. after market "Service Parts Packaging Standards Worldwide Operations". Packaging standards are available on Cummins electronic systems.
   h. The supplier shall comply with customer special requests and Cummins Inc. customer’s requests such as IMDS completion as requested by Cummins.
   i. Suppliers shall comply with the following standards:
      i. AIAG CQI-8 Layered Process Audits Guideline
      ii. AIAG CQI-9 Special Process: Heat Treat System Assessment
      iii. AIAG CQI-11 Special Process: Plating System Assessment
      iv. AIAG CQI-12 Special Process: Coating System Assessment
      v. AIAG CQI-15 Special Process: Welding System Assessment
      vi. AIAG CQI-17 Special Process: Soldering System Assessment
Q. Additional Information

1. AIAG Ordering

Cummins does not provide AIAG manuals to its supply base, however the suppliers are expected to obtain copies for their organization. All manuals (PPAP, APQP, etc.) referenced in the Handbook may be ordered by contacting the AIAG at:

Automotive Industry Action Group
P O Box 633719
Cincinnati, OH 45263-3719
Phone (248) 358-3003  Fax (248) 799-7995

or, ordering information is available on AIAG’s web site at:
www.aiag.org

For information on distributors outside the United States with non-English language publications, see the AIAG web site:
www.aiag.org/quality/dist.html

2. Forms

Many forms utilized in the Cycle are those referenced through PPAP, APQP, etc. Of all those referenced forms, the one that is required to be used without modification is the North American Truck Industry Part Submission Warrant (PSW) illustrated in PPAP. Other referenced forms (e.g., the Control Plan in APQP), are preferred to be used without modification; however, supplier modified forms are acceptable provided all information contained on the reference format is included.

Other forms utilized in the Cycle may be Cummins-required (e.g., Advanced Quality Planning Status Report) or Cummins-preferred (e.g., Seven Step Problem Solving). The Cummins SQIE will answer supplier questions on whether a form must be used without modification (Cummins-required) or if the form may be substituted with a form meeting the intent (Cummins-preferred).

NOTE: Use of operator instructions in place of a control plan is not acceptable.

3. Revision Control

a. This Handbook is a controlled document. It is the responsibility of Cummins Purchasing to get the latest revision to each supplier. This will be accomplished by posting the Handbook on the Cummins Supplier Portal (www.supplier.cummins.com). It is the supplier’s responsibility to ensure compliance to customer specific requirements by periodically monitoring the website for change.

b. Cummins utilizes Lotus Notes © for electronic mail.

c. The preferred software for electronic mail attachments incoming to Cummins is Microsoft ® Word ©, Excel ©, Project ©, PowerPoint © or Adobe PDF ©).