Supplier Quality Manual

Approval			
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Name	Signature	Title	Date

Revision History	
Date of Change	**Change Summary**
04/16/04	Initial Release
09/19/07	Updated document to reference ISO/TS 16949 vs QS-9000 standards
11/19/07	Updated overall format of document including addition of cover page, approval page & table of contents
07/19/11	Removed revision dates to ISO/TS standard references on pages 5-7. Updated approvers name on page 2. Minor verbiage changes
07/29/15	Added clarification to expectations in *3.0 Nonconforming Material*. Added *2.3.13.1 Materials Reporting*. Added clarification to *Supplier Qualification*.
3/7/18	Updated PPAP, material certification and IATF requirements
7/2/18	General Update for IATF requirements

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Introduction
This Supplier Quality Document is intended to assist our current suppliers and potential new suppliers with the basis for understanding the quality expectations of Horton, Inc.

Purpose
This Document establishes the minimum quality requirements for all suppliers of production materials, whether the products being furnished are provided by the supplier directly, or are purchased from sub-tier suppliers for the use in Horton products.

This document was designed with the intent to address the International Organization for Standardization (ISO/TS 16949), (ISO 9001) and current industry standards.

Application
Horton has adopted the Quality System Requirements described in the current revision of ISO/TS 16949 standard, which is available through the Automotive Industry Action Group (AIAG) website (www.aiag.org). Suppliers must review the following Quality System Requirements and use them in conjunction with Horton Supplier Quality Requirements:

- Advanced Product Quality Planning (APQP)
- Statistical Process Control (SPC)
- Failure Modes and Effects Analysis (FMEA)
- Measurement Systems Analysis (MSA)
- Production Parts Approval Process (PPAP)

Supplier Qualification
Horton requires suppliers to be registered to the current ISO 9001 or IATF 16949 standard by an IAF (International Accreditation Forum) or IATF (International Automotive Task Force) accredited third-party certification body. The cert should display a symbol such as ANAB, UKAS, IATF or other member from IAF or IATF website. It is expected that suppliers will maintain all elements of the quality system as defined in the applicable standard. Prior to the placement of new business, a Supplier Selection Review will be conducted to determine if the proposed or existing suppliers are capable of producing product which meet the expectations and specifications of Horton Inc.

RFQ/APQP Documentation
Upon receipt of the Request for Quote (RFQ), potential suppliers must prepare and submit a document package with their quote, a written acknowledgement that technical documents provided by Horton are understood and deliverable (i.e. Supplier Quality Documents, drawings, packaging, labeling, etc.)

1.0 Management Responsibility

The supplier shall establish, document and maintain a quality system as a means of ensuring that product conforms to specified requirements. The supplier shall submit the following to Horton Purchasing personnel:

- Current copy of 3rd Party registration certification to supplier's Quality Management System (e.g. ISO 9001, IATF 16949)
- Documentation requested by Horton Inc., in an effort to adequately assess a supplier's system.

2.0 Quality Planning

The supplier shall establish and implement an advanced product quality planning (APQP) process for new products supplied to Horton. (Note: A family of product concept will be permissible upon written approval by Horton Quality Management or their designee.)

2.1 Special Characteristics or Key Control Characteristics (KCC's)

The purpose of Key Control Characteristics is to aid in the economical manufacture of quality products. KCC's require extra controls because excessive variation may affect the product's performance or the quality of subsequent manufacturing operations. Horton Engineering will identify KCC's by placing an identifier (Diamond ◊) next to the specification on the design record.

In relationship with this design KCC's concept, it is the responsibility of the supplier, in preparation of the Quality Plan, to identify additional control characteristic(s) as determined by their product and process knowledge. If the supplier retains the ownership of both the design and the manufacturing, then the supplier shall be responsible for both design KCC's and process KCC's. KCC's must be clearly stated in the supplier's quality plan returned to Horton Inc. during the Production Part Approval Process (PPAP). It is also understood that all product features shall be manufactured within all drawing specifications.

KCC's have additional requirements for Initial Process Studies and ongoing monitoring using Statistical Process Control (SPC). Refer to sections 2.3.11 and 2.3.12 for additional details.

2.2 Control Plans

The supplier shall develop Control Plans at the system, subsystem, component and or material level for the product supplied. The Control Plan shall include the information required in the Control Plan form located in the Appendix of the most current edition of the Advanced Product Quality Planning (APQP) and Control Plan manual, published by the Automotive Industry Action Group (AIAG).

The Control Plan shall cover three distinct phases:

- Prototype – a description of the dimensional measurements, material, and performance tests that will occur during Prototype build.
- Pre-launch – a description of the dimensional measurements, material, and performance tests that will occur after Prototype and before full production.
- Production – documentation of product/process characteristics, process controls, tests, and measurement systems that occur during mass production.

Control Plans shall be reviewed and updated when any of the following occur:

- The product is changed
- The processes are changed
- The processes become unstable
- The processes become non-capable
- Inspection method, frequency, etc. is revised
- Defects are identified downstream from the point of control

2.3 Product Part Approval Process (PPAP) Requirements

Horton's component qualification process shall be conducted in accordance with the most current edition of the Production Parts Approval Process (PPAP) manual published by the Automotive Industry Action Group (AIAG).

The purpose of the PPAP process is to assure that purchased components and assemblies meet the drawings and specifications specified by Horton that define the component requirements.

Horton requires its suppliers to submit PPAP documentation as specified on the purchase order. If a PPAP is stated on the PO and the requirements are not specified, the default PPAP is Level 3 for the specific purchase order. A Level 4 PPAP will be specified with a checklist of the submissions that Horton is requiring. The table below can be used for reference.

	Horton Requirement	Submission Level Level 3	Level 4
1	Design Record	S	H
2	Engineering Change Documents	R	H
3	Customer Engineering Approval	S	H
4	Design FMEA	S	H
5	Process Flow Diagrams	S	H
6	Process FMEA	S	H
7	Control Plan	S	H
8	Measurement System Analysis Studies	S	H
9	Dimensional Results	S	H
10	Material, Performance Test Results	S	H
11	Initial Process Studies	S	H
12	Qualified Laboratory Documentation	S	H
13	Appearance Approval Report	S	H
14	Sample Product	S	H
15	Master Sample	R	H
16	Checking Aids	R	H
17	Records of Compliance	S	H
18	Parts Submission Warrant (PSW)	S	H

KEY
S= The supplier should submit documentation to Horton and retain records at the supplier location.
R= The supplier should retain documentation at their location and have available at Horton's request.
H= The supplier should retain at their location and submit per Horton request.

2.3.1 Significant Product Run

Horton recognizes that small production trials runs are common, the supplier shall use the guidelines described in the PPAP manual to maximize the number of parts run during the production trial run in order to have as many parts as possible available to inspect for capability studies. When not enough data is available (minimum of 30 samples) contact the Horton Supplier Quality Engineer to develop a suitable plan.

The PPAP production run shall be manufactured at the production site using the tooling, gaging, process, materials, and operators from the production environment. Parts from each unique production process, e.g. duplicate assembly line and or work cell, each position of a multiple cavity die, mold, tool or pattern, shall be measured and representative parts tested.

Inspection and testing used for PPAP shall be performed by a qualified laboratory (Refer to the most current edition of the PPAP manual, published by the Automotive Industry Action Group (AIAG)). Commercial and/or independent test laboratories used shall be accredited to American Association for Laboratory Accreditation (A2LA) (Refer to ISO/IAC 17025). When a commercial laboratory is used, the supplier shall submit the test results on the laboratory letterhead, or the normal laboratory report form. The name of the laboratory that

performed the tests, the date(s) of the tests, and standards used to run the tests shall be indicated. **Blanket statements of conformance are unacceptable for any test results.**

2.3.2 Design Records

The supplier shall maintain all design records for the saleable product, including design records for component or details for products. Where suppliers are design responsible, records shall be made available to Horton upon request.

2.3.3 Supplier Change Request / Customer Notification Process

Suppliers shall notify Horton of any planned changes to the design, process, or site as outlined in the most current edition of the PPAP manual, published by the Automotive Industry Action Group (AIAG).

Supplier Request for Change procedure and Supplier Request for Change form can be found on Horton's Website: https://www.hortonww.com/supplier-information.html

Suppliers shall not implement any of these planned changes until Horton has provided authorization or approval. Horton will determine if a PPAP is necessary, and what level of PPAP for the supplier to submit for the requested change.

2.3.4 Design Failure Modes and Effects Analysis (DFMEA)

The supplier shall have a Design FMEA developed in accordance with, and compliant to the most current edition of the Failure Modes and Effects Analysis (FMEA) manual, published by the Automotive Industry Action Group (AIAG), for parts or materials for which the supplier is design responsible.

2.3.5 Process Flow Diagrams

The supplier shall have a process flow diagram in a format that clearly describes the production process steps in sequence. Refer to most current edition of the Advanced Product Quality Planning (APQP) and Control Plan manual published by the Automotive Industry Action Group (AIAG).

2.3.6 Process Failure Mode and Effects Analysis (PFMEA)

The supplier shall have a Process FMEA developed in accordance with, and compliant to the most current edition of the Failure Modes and Effects Analysis (FMEA) manual, published by the Automotive Industry Action Group (AIAG).

Note: A single Design or Process FMEA may be applied to a process, manufacturing a family of similar parts or material concept if approved by Horton Supplier Quality Engineering. Any questions in regards with this step, contact the Horton Supplier Quality Engineer.

2.3.7 Dimensional Results

The supplier shall provide evidence that dimensional verifications required by the design record and Control Plan has been completed and results indicate compliance with specified requirements. The supplier shall submit a copy of the drawing with each dimension, test, and or specification identified with a unique number. These unique numbers shall be entered onto the dimensional or test results sheets that are located in the Appendix of the most current edition of the PPAP manual, published by the Automotive Industry Action Group (AIAG).

2.3.8 Material Test Results

The supplier shall perform tests for part(s) and production material(s) when chemical, metallurgical, dimensional, physical, electrical, and reliability requirements are specified by the design record or Control Plan form located in the Appendix of the most current edition of the PPAP manual, published by the Automotive Industry Action Group (AIAG).

Material test results are required for submittal as specified on the purchase orders. If not specified on the purchase order, it is the supplier's responsibility to submit material certificates each quarter to the following e-mail address below. Material certifications should include chemical, physical and metallurgical properties.

quality@hortonww.com

2.3.9 Performance Test Results

The supplier shall ensure that all tests are completed for all part(s) or product material(s) when performance or functional requirements are specified by the design record or Control Plan form located in the Appendix of the most current edition of the PPAP Manual, published by the Automotive Industry Action Group (AIAG). Supplier may use outside accredited lab/test facilities to perform required tests.

2.3.10 Initial Process Studies

The level of initial process capability or performance shall be determined to be acceptable prior to submission for all Special Characteristics (KCC's) designated by Horton Engineering on the design record.

For KCC's that can be studied using variable data, the supplier shall utilize one of the following techniques to study the stability of the process:

- X-Bar and R Charts, n = 5,
  OR
- Individual X – Moving Range,

Note: Minimum number of subgroups or points to be determined by Horton Supplier Quality Engineering.

For initial process capability studies using a minimum 35 continuous production run, Horton's acceptance criteria for evaluating process study results are as follows:

Minimum Capability Requirements: short term P_{pk} of 1.67 or greater with long term capability C_{pk} of 1.33 or greater based on a stable process.

The supplier shall contact Horton Supplier Quality Engineering if the criteria cannot be attained by the PPAP submission date. The supplier shall then submit to Horton a formal corrective action plan and a modified Control Plan providing for 100% inspection.

2.3.11 Statistical Process Control (SPC)

The supplier shall utilize SPC to monitor KCC's outlined in section 2.1. The SPC techniques shall be implemented according to and compliant to the latest edition of the SPC manual, published by the Automotive Industry Action Group (AIAG).

GRR	Decision	Comments
Under 10%	Generally considered to be an acceptable measurement system.	Recommended when trying to sort or classify parts when tightening process control is required.
10%-30%	Acceptable for some applications.	Needs to be reviewed with Horton.
Greater than 30%	Unacceptable.	Measurement system needs to be improved and reviewed with Horton.

2.3.12 Measurement System Analysis Studies (MSA)

The supplier shall have applicable Measurement System Analysis studies, e.g. gage R&R, bias, linearity, stability studies, for all equipment used for new or modified gages, measurement, and test equipment.

(Note: Horton may accept the use of Gage R&R studies on families of gages and equipment. Contact Horton Supplier Quality Engineering with questions.)

2.3.13 Part Submission Warrant (PSW)

Upon satisfactory completion of all required measurements and tests, the supplier shall record the required information on the Part submission Warrant (PSW) form CFG-1001 (Refer to the Appendix in the most current edition of the PPAP manual, published by the Automotive Industry Action Group (AIAG).

2.3.13.1 Materials Reporting

Horton uses the International Material Data System (IMDS) as the system for suppliers to declare all substances used in their parts. There are many learning resources available on the IMDS website (www.mdsystem.com) including the latest IMDS User Manual, new user readings, and options for training courses. If questions remain after reviewing the information that is publically available, please contact your Horton Quality representative. After Horton has accepted the MDS, the MDS ID and acceptance date must be included in the Horton PSW. An accepted MDS is a requirement to receive full PPAP approval.

2.3.14 Appearance Approval Report (AAR)

An Appearance Approval Report (AAR) shall be completed for each part(s) for which a submission is required if the product/part has appearance requirements on the design record. (The AAR and how to complete an AAR can be found in the Appendix in the most current edition of the PPAP manual, published by the Automotive Industry Action Group (AIAG).

2.3.15 Sample Production Parts

All sample parts shall be sequentially numbered and 100% inspected. Inspection results with corresponding identification numbers shall accompany parts when shipped to a Horton facility. Containers shall be clearly marked “samples” on outside corners of each box. All parts shipped prior to PPAP approval will be considered “sample” components and will require full documentation unless prior approval is granted, in writing, by Horton Supplier Quality Engineering.

2.3.16 Customer PPAP Status

Full Approval: indicates that the part or material meets all Horton specifications and requirements. The supplier is therefore authorized to ship production quantities of the product.

Interim Approval: permits shipment of material for production requirements on a limited time or piece quantity basis. (Note: in this situation Horton will notify the supplier, agree upon an action plan, and require the supplier to re-submit the appropriate documentation.)

Rejected: means that the submission, the production lot from which it was taken, and accompanying documentation do not meet Horton's requirements. The submission and/or process, as appropriate, shall be corrected to meet customer requirements. A re-submission must be approved before production quantities may be shipped.

2.3.17 Record Retention

PPAP records shall be maintained for the length of time that the part or product is active plus one year (active is defined as both production and service). The supplier shall ensure that the appropriate PPAP records from a superseded part PPAP file be maintained. (e.g. Records or documents that should be carried forward from the old file to the new file would be material certs, dimensional results, etc.)

3.0 Nonconforming Material

A supplier must immediately notify the Horton Supplier Quality Engineering and Purchasing Departments if it is discovered that nonconforming material may have been shipped to any Horton related facilities. Immediate notification should be made by telephone followed by written documentation of the problem, lot size, shipment dates, lot identification etc.

If nonconforming material is discovered at a Horton location, Horton reserves the right to reject the entire lot or make other disposition. Horton Quality or Purchasing department will notify the supplier, including a request for 8D corrective action. Upon notification, the supplier must provide a written containment and replacement plan to the Horton Quality department within 24 hours. Containment may include full replacement of all suspect material, 100% inspection of all product at or en route to Horton location(s), as well as product in process at supplier's facility or subcontractor. In addition, a "clean point" with first known conforming parts must be communicated to Horton. To protect production schedules of Horton and their customers, Horton reserves the right to initiate 100% inspection at their facility or by third party. All expenses incurred shall be billed to supplier responsible for defective component(s).

Suppliers are expected to take ownership of the 8D process, lead root-cause investigations, and report to Horton on a timely basis. Corrective action notification will be sent through Horton's

corrective action portal. Within 24 hours, containment D3 is required. Suppliers are required to determine root cause D5 14 calendar days of notification. The corrective action completion due date through D8 is 30 calendar days. Control plans and PFMEA updates are required as supporting evidence to prevent recurrence. In all cases, the supplier shall 100% inspect material until corrective action(s) have been agreed with Horton and implemented, with containers clearly marked accordingly.

3.1 Disposition of Nonconforming Material

Nonconforming material found at any Horton related facility is subject to several possible dispositions dependent on the nature of the nonconformance and supplier input.

- Supplier to rework and or sort at Horton facility at the supplier's expense
- Scrap at Horton facility at supplier's expense
- Return to supplier at supplier's expense
- Use with a Horton approved deviation