



North American Lighting, Inc.

A **KOHLER** Group Company

Title: NAL Supplier Quality Assurance Manual (SQAM)

Reference: SQL-3-019

Revision Date: 3/18/19

Approval Authority: Manager, Quality Systems / Tech. Serv. / Supp. Dev. Prep.



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# North American Lighting, Inc.

## Supplier

## Quality

## Assurance

## Manual

## (SQAM)

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Prepared by: Quality Systems Group



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**Purpose:** To establish a Supplier Quality Assurance Manual for Purchased Material.

**Scope:** This document is to be used by suppliers to NAL as a guideline for the expected quality of products that NAL receives for use in assembly of its exterior lighting products.

**Work Instruction:** **1.0 Policy**

It is the policy of North American Lighting, Inc. to select those suppliers of materials that can meet the requirements of all specifications and contract arrangements; and to expect that suppliers selected will warrant that all products or services furnished are in conformance with active purchase agreements, the provisions of this Supplier Quality Assurance Manual, Standard Supplements and any special instructions stipulated on drawings, specification sheets or other NAL documents. The supplier’s level of compliance will be determined by NAL through supplier surveys, process reviews, sales reviews, statistical data monitoring, appropriate receiving inspection, verification of the production process, supplier assessments and through finished product validation.

This Supplier Quality Assurance Manual (SQAM) defines the minimum supplier quality assurance practices that are acceptable to NAL. The intent of this SQAM is to document uniform minimum requirements that lay the foundation upon which a long-term and prosperous customer/supplier relationship may grow and to secure the future activities that will enable us to continually meet the requirements and expectations of our customers in all aspects of business.

Current active agreements established by Purchasing, Engineering and Supplier Quality Engineering are not to be voided or overridden by this document. Any special instructions shown on drawings or specifications are to remain in effect unless official notice of termination is received.

**2.0 NAL Purchasing**

NAL Purchasing has an objective to procure components and raw materials of superior quality and reliability that exceeds customer expectations on a global basis. All sourcing decisions are confirmed based on Responsiveness, Quality, Cost and Delivery information received during the quoting process. Our focus on partnership with our suppliers is committed to continuous improvement of systems that influence quality of the incoming product. NAL promotes long term relationships with suppliers to create an environment of support with the supply chain.

Prior to sourcing to a potential supplier, our Purchasing Management will invest time and effort to understand business culture and importance of customer support at all levels of a given organization. During the quoting process, NAL Purchasing will require our suppliers to complete and forward quote requests on NAL provided forms. Where applicable, a Cost Breakdown Worksheet would be required from the supplier prior to sourcing. It is critical that all commercially related issues that occur pre-launch or post-launch must be communicated directly with the NAL Buyer prior to finalizing the agreement. Suppliers must have in writing an approval from the Buyer prior to investing capital or time needed to support a specific program. Any issues regarding chargebacks over commercial issues should also be directed to your buyer in a timely manner. See Supplier Chargeback Table 3 below.



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## 2.1 NAL Supplier Selection

NAL Purchasing will finalize the sourcing decision, which may be based on feedback provided from NAL Supplier Quality Engineering, NAL Supplier Preparation & Development, etc. Five important pieces of information that may be used for this decision are:

1. The General Business Assessment
2. Supplier Evaluation Survey, completed and sent to the NAL Buyer.
3. Evaluation of A Rank history.
4. Evidence of compliance to ISO9001 2015, with the preference of compliance to IATF16949.
5. For Electronics Suppliers, a specific audit must be performed using the detailed Electronics Audit Sheet and results with action plan must be reported to NAL Purchasing and Corporate Quality Executive Management.

Note: NAL encourages suppliers to become compliant to IATF16949.

## 2.2 NAL Current Supplier Management

NAL will evaluate its current supply base using the data from the Supplier Quality Engineering Department. This data includes a monthly rating based on the Suppliers' Delivery, number of SQCs issued, the number of A rank SQC's, and PPM. The Supplier Quality Engineering Department will use this list as a focus of their efforts; especially, where the effectiveness of the countermeasures is in question. Delivery information will be used by NAL Purchasing to focus their efforts on the Suppliers whose on-time delivery is < 90%. The goal of Purchasing shall be 100% on-time delivery for all NAL Suppliers.

## 3.0 Quality Control Function

### 3.1 General

Material manufactured for NAL's use in assembly of the final product shall be produced, controlled, inspected and tested in accordance with the requirements of the SQAM. In addition, the SQAM establishes minimum control practices, procedures and the necessary documentation that may be part of the supplier's quality control system.

The supplier shall provide and maintain a quality control system that will ensure all material submitted to NAL for acceptance conforms to the provisions of the purchase agreements, whether manufactured or processed by the supplier or purchased from its suppliers. The supplier shall perform or have performed all the necessary inspections and tests required to substantiate product conformance to drawings, specifications and contract requirements. NAL's acceptance criteria are **ZERO** defects for all inspections.

The supplier inspection system shall be documented. Such documents shall be available for review by NAL Purchasing, Engineering and Supplier Quality Engineering representatives prior to the initiation of production and as required throughout the life of the contract. As a reference to the supply base, NAL classifies defects in a ranking system and defines them in the following manner:



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Rank	Category	Examples
A	Any type of functional defect which would cause the end product (Lamp Assembly) to not function properly, or to be in violation of FMVSS or other government regulatory agency requirements. This includes electronic components as well as any component related to the photometrics of the assembly	PCB Open / shorted circuit Wire Harness not properly crimped Bulb pre-damaged LED/PCB Damage Molded/Coated part that will cause photometric failure
B	All other characteristics not specified above which could affect form, fit, or function	Damaged / broken mounting tabs
C	Appearance / cosmetic related discrepancies	Scratches/ Damage

### 3.2 Purchased Material and Supplier Control

The Supplier shall establish a system of control of purchased materials and subcontracted processes to ensure compliance with all NAL drawings, specifications, requirements of the SQAM, SQAM Supplements and/or requirements of any alternative active purchase agreements.

Acceptable methods of supplier control include:

- 3.0 incoming inspection and/or tests
- 4.0 supplier implementation of SPC
- 5.0 verification by the production process, where by manufacturing or assembly cannot be completed if a deficiency exists.

NAL recommends using a combination of “supplier implementation of SPC” and “verification by the production process” in conjunction with an extensive advanced product quality planning program (APQP) as outlined in Section 9.0 of this manual.

Suppliers are required to maintain a contingency plan which addresses potential shortages that could affect NAL and the immediate notification of NAL’s buyers of that issue.

### 3.3 In-Process Inspection

The supplier shall establish the necessary in-process inspection procedures to ensure that the material continues to meet all physical, dimensional and visual requirements, as applicable. All materials produced during machine setups, tool changes and process modifications shall be checked 100% for the characteristics affected by the operation until material conformance and process capability are demonstrated.

### 3.4 Rework and Salvage

The supplier shall establish the necessary instructions for salvage and reclamation procedures as



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required for the product type. Critical products will require NAL's approval of the salvage procedure. Special handling or identification after such repair or reprocessing may be required. The necessary re-inspection and/or testing shall be performed on all rework to ensure conformance to specifications prior to shipment of reworked or salvaged product. Questions regarding the criticality of the product or requests for approval of a reprocessing procedure are to be directed to NAL's Supplier Quality Engineering Department.

#### **4.0 Material Control and Quality Identification**

##### **4.1 General**

The supplier shall establish a documented system for the control of all material. The inspection and test status of all material shall be identified by this system. The documentation shall include a description of the applicable containment areas and product identifying devices. Product removed from the normal process flow shall be segregated and clearly marked as to quality status.

##### **4.2 Non-conforming Material**

Non-conforming material shall be clearly identified and isolated in segregated holding areas to prevent its inadvertent return to the normal process flow.

The supplier shall establish written instructions for the proper control, disposition and traceability of non-conforming materials, including the method of identification.

Under no circumstances shall the supplier ship non-conforming material to NAL. The supplier is responsible for the immediate notification to the using NAL plant, if it is known or suspected that non-conforming materials have been inadvertently shipped.

##### **4.3 Non-conforming Material Found at Supplier**

- If the supplier suspects' nonconforming material may have shipped to NAL, the supplier must: (a) Contact NAL Receiving Inspection to report suspect shipment – (b) Contain the defect both at their facility and at NAL – (c) Provide NAL with a formal problem solving report within 10 calendar days.
- No SQC will be issued to the supplier and no defects will be added to their PPM so long as no nonconforming material has been assembled at NAL, shipped to NAL's customer, and if all items in #1 above are addressed.
- Upon notification NAL Receiving Inspection will confirm no nonconforming material exists in NAL's inventory.



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#### 4.4 Special Shipment Identification Tags

1. All purchased components marked with an “orange” Special Shipment Identification Tag “PURC-012” must be routed through the Receiving Inspection Department upon arrival at NAL.
2. Purchased product must be marked with Special Shipment Identification Tags in the following instances:
  - a. prototype samples (minimum of sample request required for release from Rec. Inspection)
  - b. Pre-production samples (minimum of sample request required for release from Rec. Ins.)
  - c. PPAP samples (minimum of provisional ISIR required for release from Rec. Inspection)
  - d. 1<sup>st</sup> production shipment (minimum of provisional ISIR required for release from Rec. Inspection)
  - e. 2<sup>nd</sup> production shipment (minimum of provisional ISIR required for release from Rec. Inspection)
  - f. 3<sup>rd</sup> production shipment (minimum of provisional ISIR required for release from Rec. Inspection)
  - g. Dimensional data samples
  - h. Certified stock shipment
  - i. Countermeasure stock shipment
  - j. Engineering change shipment (minimum of provisional ISIR required for release from Rec. Inspection)
  - k. Process change (other than countermeasure) shipment
3. All Special Shipment parts are subject to sort at the supplier’s expense. The determination to sort will be made by the Quality Manager or delegate.
4. Product received at NAL that does not possess the required Special Shipment Identification is subject to the SQC process.
5. All products received that does not meet requirements for the specified shipment or sample are subject to the SQC process.

#### 4.5 Lot Control

NAL may require the supplier to provide traceability of materials as to manufacturing, shipping and processing dates. The need for this type of lot control is based largely on product type and may be required at the discretion of the NAL Supplier Quality Engineering Department. As a rule, all products manufactured in small batch quantities, such as molding compound and periodically produced molded or machined parts, should be lot traceable. In cases such as these, when lot or batch segregation is required for proper control, lot identification procedures shall be documented and implemented, this includes FIFO requirements.



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#### 4.6 International Material Data System (IMDS)

Each NAL Supplier shall set up an IMDS account at URL [www.mdsystem.com](http://www.mdsystem.com). NAL Suppliers can access the Material Data System by clicking on the linked web address above. Once on the homepage, click on “Public IMDS Pages” to get Training and other Services.

The ID Number for each material or component shall be provided to NAL as part of the PPAP package, effective January 1, 2005.

### 5.0 Gages and Gage Control

#### 5.1 General

The supplier shall make provisions for the proper maintenance, inspection and control of gages and testing equipment to ensure continued accuracy. Such devices shall be calibrated at established frequencies against appropriate standards. The supplier shall document the calibration status and the fitness for use of each device. Calibration shall be traceable to the National Institute of Standards and Technology (NIST). Measurement system. Variation shall be determined for all gages and test equipment utilized in the production process. NAL recommends the Gage R&R procedure in the Measurement Systems Analysis manual published by AIAG.

#### 5.2 Requirements for Special Gauging and Reflex Instrumentation

The supplier is responsible for the provision of the necessary gages and testing devices required to ensure material conformance, unless provided by NAL. Those suppliers who mold reflexes for NAL shall be required to have available a certified, calibrated vertical photometer to measure reflex reflection. The reflex verification shall be a requirement in the Supplier Process Control Plan. If the photometer is temporarily out of service for maintenance or calibration, an immediate written notification shall be given to NAL’s Supplier Quality Engineering Department. It is the responsibility of the assigned SQE to notify Receiving Inspection of the temporary “out of service” condition. All product not verified during the downtime shall be required to have the orange NAL Special Shipment Identification Tag on each container identifying the material as potentially non-conforming.

If production type tooling, such as jigs, fixtures, templates and patterns, are used as a media for quality control, such devices will be subject to the same controls applicable to gages or test equipment.

### 6.0 Corrective Action

#### 6.1 Supplier Quality Concern

When the supplier detects non-conforming materials, or materials are returned by NAL for non-conformance, the supplier shall take immediate action to provide containment (**see page 29 for containment flowchart**) for all related lots concerning the non-conforming characteristic(s). The supplier shall take prompt and positive action to isolate and correct any conditions, which could



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result in the manufacture or shipment of materials that are non-conforming. Additional inspection for the non-conforming characteristic(s) shall be implemented pending the determination of the effectiveness of the corrective action. When applicable, statistical process control methods should be used to verify corrective action effectiveness and maintained to prevent recurrence (see also NAL SPC Policy, Section 19).

If a supplier receives a “Supplier Quality Concern” (SQC) from NAL, the supplier shall immediately implement containment activities as described above. Immediate corrective action steps should be taken and those steps (steps 1-3 on a traditional 8D) should be documented and submitted through PLEX within 24 hours from issue of SQC. In addition, the supplier shall submit the complete corrective action through PLEX within 10 business days from issue of SQC. If a final 8D cannot be completed within that timeframe, the supplier shall contact the appropriate NAL SQE and request an extension. In conjunction with the request for extension, the supplier shall submit the updated 8D through PLEX with actions taken to that point and which also includes an action plan with dates and responsibilities for the remaining future actions. If an SQC is issued, supplier corrective action reports shall include, where applicable, a modification of the PFMEA and PCP. All production shipments following the receipt of the SQC, shall be 100% inspected and/or tested for the noted defect(s) until Permanent Countermeasures are implemented. The first three (3) certified shipments shall be labeled as such using the fluorescent orange Special Shipment Identification Tag. (See also Section 14)

If a supplier receives an “A Rank SQC” or is notified by any other means that the supplied purchased part is suspect for a functional defect and in addition to the above-mentioned requirements, the supplier will also be required to complete an “A RANK IMMEDIATE REACTION\_SUPPLIER” form and return it to the applicable SQE within 24 hours of origination. This form will be initially completed with basic information by the NAL SQE and then sent via email to the supplier representative for full completion. This form will be added to the supplier history by attaching it to the SQC electronically if one is issued.

## 6.2 Return Material Authorization

In the event North American Lighting rejects material for the supplier’s failure to meet NAL requirements, the supplier will be required to provide an RMA to the NAL plant RI group **within 3 Business Days** of notification or the material will be scrapped, and the supplier will be debited.

## 7.0 Product & Process Change Control

### 7.1 Drawing & Specification Control

The supplier’s document control system shall ensure that the latest drawings, specifications and other pertinent information are available at the manufacturing, testing or inspection locations. The system shall provide for the removal of all obsolete drawings and specifications from all points of use. No drawing, specification, PFMEA or Control Plan shall be changed without NAL’s written authorization. All blueprints and specifications should be reviewed at a minimum frequency of once per calendar year to ensure that only the latest revision level is in use. *Any discrepancy shall be noted in writing to NAL’s Supplier Quality Engineering Department.*



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## 7.2 Process Change Control affecting Form, Fit or Function

The supplier shall establish methods and procedures for controlling changes (4M change control management). In addition, any change to a process that may/will affect the form, fit, function or any combination thereof to a component used in an application at North American Lighting, Inc. will require supplier notification to the NAL SQE prior to implementation. Examples of (not limited to) changes include: material change, location change, supplier change, processing parameters (plastic/rubber) outside the established process, equipment change, die and press set-up for (metal/rubber parts), assembly process or any other situation determined by NAL Supplier Quality Engineering (in writing) as a mode that should be included in the aforementioned list are susceptible to this requirement. The supplier should notify the NAL SQE initially to discuss any planned changes to receive direction / instruction on how to proceed. Unless waived in writing by the Supplier Quality Engineer at North American Lighting, a process change will require revalidation to ensure continued conformance to specifications. Refer to Sample Submission Procedure (Section 15).

Before a Supplier Process Change is initiated, the SQL-4-003 “NAL SUPPLIER PROCESS CHANGE REQUEST (PCR): PLAN AND AUTHORIZATION” form, PLAN STAGE, must be completed and submitted to the assigned Supplier Quality Engineer. The Supplier may not proceed until the Supplier Quality Engineer returns this form with the ANSWER/INSTRUCTION TO PLAN portion completed indicating an “APPROVED” status. Upon SDOC submission, final approval and SDOC creation, the assigned Supplier Quality Engineer will complete the FINAL REVIEW/APPROVAL portion of the form and issue a final copy to the Supplier.

## 8 Documentation Control

### 8.1 Written Procedure

The supplier shall provide and maintain written procedures covering all aspects of its quality control program.

### 8.2 Inspection Instructions

All inspections and tests shall be described by clear, complete and current written instructions. The instructions shall include as a minimum requirement:

1. Method of inspection
2. Tools to be used
3. Standard for acceptance and rejection
4. Sample size and frequency concerning inspection shall be documented.
5. Any NAL/Customer identified critical points/special characteristics are to be monitored (identified as such on test records). See QLA-3-008 Special Characteristics.
6. All critical points/special characteristics require a 30 piece study showing capability. Points having CPK's between 1.00 to 1.32 will be required to have improvement activities.
7. Suppliers may use their own company designation for critical point/special characteristics on documentation/records.



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The supplier shall maintain adequate records of all inspections and tests that are performed as parts of the quality control function. The records shall contain, as a minimum requirement, the following:

1. Characteristic(s) observed
2. Frequency of observation
3. Number and type of deficiencies found
4. Material disposition
5. Identification of the recorder
6. Corrective Action
7. Date of inspection

### 8.4 Record Retention

Suppliers are to use the below Record Retention table to determine the length of time records are to be kept. For materials with open P.O.'s longer than 10 years, no records need to be retained longer than 13 years. Examples: bulbs, molding compound, adhesives, etc.

<i>Record Retention Matrix</i>			
No.	Title	Description	Retention Time
1	<b>Production Part Approvals</b>	Records and documents required for Production Part Approval Process (PPAP) in accordance with PPAP Reference Manual, i.e., control plans, supplier PPAPs, PSWs, etc.	20 years
2	<b>Purchase orders/Purchase Amendments</b>	Purchasing documents for procurement of materials, components, products, and services to be incorporated into the finished product.	20 years
3	<b>Tooling records</b>	Records associated with the purchase of production tooling.	20 years
4	<b>Tooling Preventive Maintenance Records</b>	Records documenting preventive and predictive maintenance.	20 years
5	<b>Tooling Repair Maintenance Records</b>	Records documenting tool repair/modifications.	20 years
6	<b>Engineering Design Output Documents</b>	Design FMEAs, drawings, specifications, bills of material, process procedures, calculations, prototype test reports, and other documents established in the course of product design.	20 years



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7	<b>Contract Review Records Offers</b>	Team Feasibility Commitments, and other documents established in the course of negotiating and implementing contracts.	20 years
8	<b>ECN's</b>		20 years
9	<b>CAD Data Transfer Forms</b>		One year.
10	<b>Customer Complaint Records</b>	Files with customer complaints and records with short and long-term resolutions.	End of production, plus twelve years.
11	<b>Supplier Evaluation and Performance</b>	Records Documents demonstrating subcontractor quality capability and quality performance.	<b>20 years</b>
12	<b>Calibration Certificates</b>	Inspection, measuring, and test equipment calibration certificates.	20 years
13	<b>Nonconforming Product Records</b>		20 years
14	<b>Corrective and Preventive Action Records</b>		20 years
15	<b>Quality Verification Records</b>	Inspection and test results, performance control charts (SCs), material certifications, photometric results, etc.	20 years
16	<b>Training Records</b>	Personnel training records.	20 years
17	<b>Management Review Records</b>	Minutes of management review meeting.	<b>20 years</b>
18	<b>Records of Internal Quality Systems Audits</b>		20 years
19	<b>Product Quality Records</b>	Work orders, traceability records, non-performance control charts (SCs), first piece, quality checks, M/C checksheets, Set-up change checksheets, PM checksheets, etc.	20 years
20	<b>Abnormality Logs</b>		20 years
21	<b>Project Management Documents</b>	Timing Charts, New Project Progress Report (NPPR), & Team Feasibility Commitment.	20 years
22	<b>Warranty Records</b>	Customer Warranty Data	20 years



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## 9.0 Advance Product Quality Planning (APQP)/New Part Approval Process

### 9.1 General

Advanced Product Quality Planning (APQP) refers to all the pre-production activities that help ensure materials being delivered to NAL consistently meet all NAL requirements and expectations. The level of control exercised over each supplier will be consistent with the criticality and the complexity of products supplied, as well as, suppliers' demonstrated capability.

### 9.2 Pre-Qualification of New Suppliers & Registration Requirements for all Suppliers

Potential suppliers of production material, at NAL's discretion may undergo an on-site Quality System Assessment performed by any or all of the following:

1. NAL Purchasing/Supplier Quality Engineering
2. NAL Supplier Preparation & Development Engineering
3. An NAL approved second party OEM
4. A third-party registrar

Suppliers currently supplying production material to NAL are encouraged to seek third party registration to ISO/IATF 16949; **however, they shall be registered to ISO9001 by a third-party firm** (See Section 13.0 for contact information). If they are not IATF16949 or ISO9001 certified, they must be working on their third-party certification to obtain certification within fourteen months after signed sourcing agreement. It is expected that the initial pre-audit for certification will take place approximately eight months into the certification process. If certification is not achieved within fourteen months of signed sourcing agreement, the supplier is to be put on new business hold and/or the start of the de-sourcing process will begin. NAL will monitor supplier quality system development on an ongoing basis by performing Process Reviews (see Section 9.10), Impact Activities (see Section 11.0) and Quality System Assessments based on ongoing supplier performance in the areas of quality, cost, delivery and service.

### 9.3 Supplier Performance Measurables

It is the policy of North American Lighting to source products to suppliers who consistently perform at acceptable levels in the areas of Product Quality, On-time Delivery performance, Service, and Total Product Cost.

### 9.4 Design Review Meeting

A Design Review meeting may be required prior to initiating production tooling. The Design Review meeting is held at the discretion of the Supplier Quality Engineer and NAL Buyer; however, a Design Review meeting will typically be required for all non-standard functional parts.

At this meeting Critical Product Characteristics will be identified. Critical Characteristics may be identified by symbols placed on the product blueprints or in related Engineering Specifications. Unless waived in writing by NAL, all Critical Characteristics require the supplier to submit proof



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of capability as defined in Section 9.9 and a documented method of ongoing control as defined in Section 9.8.

In addition, all product requirements and specifications will be reviewed to assure that the supplier is capable of meeting all NAL requirements and expectations. In the event a Design Review meeting is not required, the supplier shall complete the Design Review Check Sheet.

### 9.5 Award Job/Start Tooling

The supplier should start production tooling only after they have reviewed and agreed to all applicable NAL drawing and Engineering specifications and agree to abide by the requirements outlined in the NAL SQAM, SQAM Supplements and the requirements of any alternative active purchase agreement.

### 9.6 PFMEA

The supplier is required to complete a Potential Failure Mode and Effects Analysis (See Section 17) for all failure modes that might exist in the manufacturing process, as well as, any other associated processes that could (if not properly controlled) result in nonconforming product.

### 9.7 Production Tooling Complete

Production tooling should be completed well in advance of the target PPAP submission date in order to provide the supplier with sufficient time to complete the Process Control Plan (see Section 9.8) and attain full PPAP approval (see Section 9.13) prior to shipping to NAL under a Production Purchase Order (see Section 9.14).

### 9.8 Process Control Plan

A Process Control Plan shall be generated in order to ensure that the manufacturing process controls are sufficient to produce defect-free products for the duration of project life. See Purchased Product Process Control Plan Procedure (Section 14).

### 9.9 Process Potential Studies

Process Potential Studies shall be performed for all identified Critical Control Points Critical Characteristics (see Section 9.4) in accordance with the guidelines established in the *NAL SPC/MSA AIAG manuals*.

### 9.10 Process Review Meeting

Upon completion of the Process Control Plan (Section 9.8) a Process Review Meeting should be held. This meeting is held at the discretion of the NAL Buyer and Supplier Quality Engineer based on the complexity of the part and the suppliers' experience and past performance with similar parts.

A Process Review Meeting will typically be held for non-standard functional parts. This meeting may be held at NAL, but, when possible, will be held at the supplier's location. At this meeting



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all aspects of the manufacturing processes will be analyzed to determine if the process controls (as outlined in the Process Control Plan) will be capable of producing the desired result of zero defects.

### 9.10.1 HVPT

After supplier has verified that all systems, equipment, and personnel are ready for the start of production and at least 2 weeks prior to submitting a PPAP, the supplier is required to conduct a final high-volume production trial (HVPT) to show evidence that they are capable of producing the quantity of parts in the timeframe they quoted to at the quality level required by NAL. The evidence from the trial will be documented on the form provided by the NAL SQE and submitted prior to PPAP.

### 9.11 Production Part Approval Process (PPAP) Submission

**Note: The term PPAP will replace the formerly used term ISIR.**

Supplier will submit a PPAP to NAL for new production parts at least 90 days prior to SOP of the program. Production samples of all new products shall be submitted to NAL for approval. See *Sample Submission Procedure* (Section 15) for details of when additional PPAP submissions are required and the correct procedure for submission preparation.

### 9.12 PPAP Verification

NAL may verify key characteristics of the PPAP.

### 9.13 PPAP Disposition

In conjunction with NAL Engineering, NAL Supplier Quality Engineering will review the supplier submitted PPAP package. At this time, the PPAP will either be Approved, Rejected or Provisionally Approved. The definition of each is defined in the *Sample Submission Procedure* (Section 15). In each case a copy of the Part Submission Warrant (PSW) and its disposition will be sent to the supplier.

### 9.14 First Production Shipment

A supplier shall attain an Approved or a Provisionally Approved PPAP prior to making a Production Shipment to NAL. Production materials shall be packaged in accordance with the *Supplier Packaging Guidelines* in Section 16.

A supplier shall submit all required statistical data (as outlined in the NAL approved Process Control Plan, Section 9.8) with each shipment for the first three (3) production shipments. **The first three (3) production shipments shall be labeled as such using the NAL Special Shipment Identification Tag. Failure to do so may result in a rejected shipment.**



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## 10.0 Submission of Ongoing Process Control Data

If NAL requires ongoing process control data, the characteristics and frequency will be clearly defined in writing and sent to the supplier with the Approved PPAP. If the supplier has any questions or concerns regarding the request for ongoing control data, the appropriate NAL Supplier Quality Engineer should be notified immediately. This data shall be submitted at the assigned frequency or a complaint will be issued, and subsequent shipments will be subject to rejection. The type of data required (check sheets, control charts, etc.) is also defined on the Process Control Plan (Section 9.8). Required process control data shall be sent with the actual material shipment and the shipment shall be identified using the NAL Special Shipment Identification Tag.

The data submitted shall be legible and clearly explained. As a minimum the data sheets should include:

1. NAL Part Number
2. Date of report
3. Manufacturing period covered by data
4. Characteristic being monitored
5. Reactions to all runs, trends or any other noted process instability.

If a supplier wishes to reduce the frequency of data submission, the Process Control Plan shall be revised and approved by NAL as described in Section 14.

## 11.0 Impact Activities

### 11.1 General

NAL will train and support its suppliers to perform “Impacts” on the manufacturing processes in an effort to reduce manufacturing:

1. Scrap
2. Inventory
3. Floor Space
4. Cycle Time
5. Labor
6. Costs

NAL will provide initial training regarding the Impact process and will be present for the initial event (typically 5 working days); however, most of the ideas and improvements will be originated by the supplier’s Impact Team Members. This is designed to make the process rewarding for all and increase the probability of success.

If improvement is achieved through the NAL Impact Activity, both NAL and NAL Suppliers will benefit from the reduction of manufacturing related costs. NAL expects suppliers to implement the continual improvement/cost reduction techniques taught during the Impact Activity.



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### 11.2 New Suppliers

A new supplier who is awarded business from North American Lighting may be required to conduct an Impact Activity after Start of Production (SOP).

### 11.3 New Projects

A supplier who is awarded new business from North American Lighting may be required to conduct an Impact Activity after Start of Production (SOP).

### 11.4 Out-Sourced Projects

A supplier who is awarded an existing production part with the support of North American Lighting production tools and/or equipment may be required to conduct an Impact Activity after receipt of such tooling and/or equipment.

### 12.0 Returned Materials

The supplier shall review all returned materials to determine the cause of the non-conformance and ensure that timely effective corrective action is implemented.

### 13.0 Quality System Assessment Reference Materials

Quality System reference publications such as ISO9001, IATF 16949, PPAP, MSA, etc. may be purchased by calling or writing the Automotive Industry Action Group (AIAG) at the address or telephone numbers listed below:

AIAG  
Automotive Industry Action Group  
26200 Lahser Road  
Suite 200  
Southfield, MI 48034

Telephone: (248) 358-3570  
Order Department: (248) 358-3003  
Fax: (248) 358-3250

Email: aiag.org

### 14.0 Process Control Plan (PCP)

The supplier shall have a PCP for each component that is manufactured and shipped to NAL, which will ultimately be a part of a finished lamp that is to be shipped to the OEM's. Refer to the latest edition of the AIAG Manuals for this format.



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The form to be used for new PCPs shall be that stated in the AIAG manual, latest edition, and can be obtained from the address in Section 13.0. Current or established PCPs should be revised to latest AIAG format where appropriate.

A Production Control Plan shall be written for all purchased “production” products that appear on the Bill of Materials of any NAL project that is purchased from a supplier.

#### 14.1 Completing the form

When completing the PCP form the anticipated effectiveness of the chosen process controls shall be in direct correlation with the “Risk Priority Number” (RPN) established on the PFMEA. The PCP shall:

1. Identity of each manufacturing process and the process and/or product control methods to be used.
2. Include the methods utilized to control purchased products and continue to follow the process flow through final inspection.
3. Have all areas of the form completed.
4. Specify that all SPC data to be supplied is to comply with the guidelines established in the “NAL SPC Policy”. (see section 19.0)

##### 14.1.1 Safe Launch Control Plan

Suppliers will be required to create/implement a safe launch plan with a zero defect mentality for a standard duration of 90 days post SOP. The supplier will be required to provide documentation in the form of a safe launch control plan or equivalent to the appropriate SQE prior to 30 days before SOP to receive approval of plan by NAL.

#### 14.2 PCP Review and Approval

The completed “NAL Purchased Part Process Control Plan” shall be reviewed at a NAL process review meeting prior to PPAP submittal. The PCP shall be submitted as part of the PPAP package. NAL will give final PCP approval as part of the PPAP package approval. Once the PPAP is approved, NAL Supplier Quality Engineering will determine if control items will be monitored on an ongoing basis by NAL’s Receiving Inspection Operations. A copy of the approved or rejected PSW – Part Submission Warrant will be returned to the supplier by the NAL Quality Secretary. A copy will also be filed by NAL Receiving Inspection for use in monitoring the incoming product.

#### 14.3 Control Data

When NAL requires the supplier to send process control data, the data type and frequency will be identified on the approved PCP. If the supplier is using a form different than the one in the AIAG manual, NAL will identify the required control data by clearly stating it in a letter which will be attached to the PSW – Part Submission Warrant package when forwarded to the supplier with disposition. Required process control data shall be sent with the actual material shipment, and the



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shipment shall be identified using the NAL Special Shipment Tag. Required process control data shall be sent to NAL with every shipment for the first three (3) shipments following the Start of Production and every quarter thereafter. Unless otherwise specified, data shall be received by the last day of the following months:

October, January, April and July.

Data not received by the end of each specified month will be considered late, and the material becomes subject to rejection. If a supplier receives a Supplier Quality Concern (SQC), any relevant process control data shall be sent with every shipment, until the SQC is closed. NAL may require an increase in the frequency of data submission, if the process stability or capability becomes questionable.

The data submitted shall be legible and clearly explained. As a minimum the data sheets shall include:

1. NAL Part Number
2. Date of report
3. Manufacturing period covered by the data
4. Characteristic being monitored
5. Reactions to all runs, trends or any other noted process instability.

NAL Receiving Inspection will receive the submitted data, verify that it meets the requirements of the PPAP and ensure that the supplier has properly reacted to all runs and trends in the data. The existence of trends indicates the process is no longer predictable and action shall be taken to bring the process back into control. All reactions to trends and out-of-control conditions shall be documented by the supplier and records maintained.

#### **14.4 Control Plan Changes**

Any modifications to an existing approved PCP shall require the submission of the revised documents and the Part Submission Warrant – PSW to NAL Supplier Quality Engineering for approval.

#### **15.0 Sample Submission Procedure**

Sample submission provides the supplier an opportunity to ensure that all purchased materials meet or exceed all NAL requirements prior to receiving production shipments of these materials. The supplier also demonstrates its initial part quality and its ability to maintain ongoing part quality for the life of the project using Process Control Plans and capability studies. All submitted samples shall be manufactured, inspected and tested in accordance with the requirements set forth in the purchased material contract.

Sample submissions shall be made under the conditions established in Table 1.



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**TABLE 1**

This table contains those instances when a supplier is expected to notify NAL and submit documentation of changes and product samples prior to making a design or process change. The assigned NAL Supplier Quality Engineer is to be consulted in the case of questions/ambiguity of requirements.

NUMBER	NAL REQUIREMENT	NAL CLARIFICATION
1	Use of construction or material than was used in the previously approved part of product.	For example, other construction as documented on a written deviation or included as a note on the design record and not covered by an engineering change. This includes but is not limited to changes in process parameters outside those noted on or referenced by the control plan, and/or changing production from one size/class/rating of production equipment to another.
2	Production from new or modified tools (except perishable tools), dies, molds, patterns, etc., including additional or replacement tooling.	This requirement only applies to tools which due to their unique form or function, can be expected to influence the integrity of the final product. It is not meant to describe standard tool (new or repaired), such as standard measuring devices or drivers (Manual or Power).
3	Production following refurbishment or re-arrangement of existing tooling or equipment.	Refurbishment means the re-construction and/or modification of a tool or machine or to increase the capacity, performance, or change its existing function. This is not meant to be confused with normal maintenance, repair or replacement of parts, etc., for which no change in performance is expected and post repair verification methods have been established. Re-arrangement is defined as activity, which changes the sequence of product/process flow from that documented in the process flow diagram, (including the addition of a new process). Minor adjustments of production equipment may be required to meet safety requirements such as, installation of protective covers, elimination of potential ESD risks, etc. These changes can be made without NAL approval unless the process flow is changed as a result of this adjustment.
4	Production from tooling and equipment transferred to a different plant location or from an additional plant location.	Production process tooling and/or equipment transferred between buildings or facilities in one or more location.
5	Change of subcontractor for parts, non-equivalent materials or services (e.g.: heat treating, plating).	Suppliers are responsible for approval and notification to NAL regarding a change of subcontracted material and/or services.
6	Product produced after the tooling has been inactive for volume production for 12 months or more.	For product that has been produced after the tooling has been inactive for 12 months or more. Notification is required when the part has had no active purchase orders and the existing tooling has been inactive for volume production for 12 months or more. The only exception is when the part has low volume, e.g. Service or specialty vehicles. However, NAL may specify certain PPAP requirements for service parts.
7	Product and process changes related to components of the production product	Any change that affects NAL performance requirements for fit, form, function, performance and/or durability requires



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	manufactured internally or manufactured by sub-contractors that impact fit, form, function, performance and/or durability. Additionally, the supplier shall concur with any requests by a sub-contractor before submission to NAL	notification to NAL. NOTE: The fit, form, function, performance and/or durability is agreed on during contract review.
8	For bulk materials only:  New source of raw material with special characteristics from new or existing sub-contractor.  Change in product appearance attributes where there is no appearance specification.  Revise parameters in the same process (outside PFMEA parameters of the approved product, includes packaging).  Change outside of DFMEA (product composition, ingredient levels) of the approved product.	These changes would normally be expected to have an effect on the performance of the product.
9	Change in test/inspection method – new technique (no effect on acceptance criteria).	For change in test method, supplier should have evidence that the new method provides results equivalent to the old method.

### 15.1 Fabrication of Samples

The samples shall be made from specified material(s), on the regular production tooling, with no operations included which will not be incorporated into regular production processing. All applicable material handling and or application specific tooling must be accepted, in writing, by the sub-component vendor for fitness of use.

The number of parts required for sample approval by the using NAL plant shall be requested by Purchasing or SQE. The number of samples required may vary depending on the nature of the part. Unless otherwise specified, the supplier will submit six (6) samples of each part number requested or a minimum of the one (1) piece per cavity when multi-cavity tooling exceeds six (6) cavities.



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## 15.2 Measurement of Conformance to Specifications

Suppliers are responsible for performing all inspection and test requirements called out on prints. They must also ensure conformance to the components design intent. Example: are conductors must conduct, fasteners must fasten, and seals must seal.

All laboratory requirements, i.e. tensile, salt spray, functional, shall be performed by the supplier or a qualified laboratory and be properly documented as a part of the sample submission.

All assemblies submitted for approval shall have all assembly dimensions shown on the drawing documented. When detail parts are specified on an assembly drawing, each detail part shall be dimensionally, and laboratory checked and documented.

Multiple mold, die and cavity parts shall have apart from each mold, die or cavity checked and submitted. All tooling shall be 100% checked.

## 15.3 Marked Print Procedure

All suppliers of parts to NAL are required to follow this procedure, which simplifies the checking and review of sample submissions and reduces misinterpretation of sample submissions.

All drawings used for sample submissions shall have each dimension, note and specification numbered in an orderly manner. To permit a systematic review, drawings should be numbered from left to right across the drawing, or in a similarly organized method.

The marked print is used in conjunction with the NAL Inspection, Laboratory and Supplemental Sample Report forms. The numbers on the drawing shall correspond with the numbers recorded on the appropriate Sample Report Form.

## 15.4 Supplier Preparation of Sample Reports

In conjunction with the marked print procedure, NAL PPAP shall be submitted.

The signature and the title of the responsible official certifies the correctness of the sample and the report findings.

The results of all inspections and test shall be documented on a fully completed Sample Report. Forms to be used are:

### 15.4.1 Part Submission Warrant – Dimensional (See Forms)

This form is used to report all dimensional findings on the parts to be submitted. When a gage, template or fixture is used to check a sample, “OK to Gage” or “OK to Template” notation is to be reported in the supplier findings column. The supplier is responsible for verifying that the checking device used is to the latest engineering level release, and that the checking device has been verified for accuracy. All cavities of



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multiple tooling shall be checked and reported. Where applicable, the actual measured samples shall be submitted to NAL with the PPAP package.

The measurement device (calipers, optical comparator, CMM, etc.) should be identified for each dimension measured. The method of part staging or setup should also be described on the PPAP Dimensional Form (attached sketches as necessary).

If any dimension is found to not meet drawing requirements, the supplier shall identify this condition by checking the “N/G” (no good) judgment column.

#### **15.4.2 Part Submission Warrant – Material (See Forms)**

This form is used to report all material physical, chemical and performance test results. The test results should demonstrate compliance to the appropriate Engineering or Industry Standard (i.e. the physical, chemical, and performance requirements for SAE C1010 Steel).

Any test result found to not meet the NAL drawing or Engineering specifications shall be identified by marking the “N/G” judgement column.

#### **15.4.3 Part Submission Warrant – Performance (See Forms)**

This form should be used to report all functional testing required by NAL’s Engineering activity or as defined on NAL drawings (i.e. ASTM B117 Corrosion Resistance, Max. /Min. torque requirement, insertion/ removal force, etc.).

Any test result found to not meet NAL drawing or Engineering specifications shall be identified by marking the “N/G” judgment column.

Copies of certification reports from sub-contractors and independent laboratories should be attached as supporting documentation to the information described on the Sample Report; however, all material and performance test data shall be in the format outlined in the laboratory form (i.e. Test Method, followed by Requirement, followed by Actual Test Result 1,2 &3, followed by a Judgment OK/N/G).

#### **15.4.4 Appearance Approval**

Any products that may be rejected by the customer on the basis of visual/cosmetic defects (i.e. painted parts, exterior trim parts, etc.) shall be submitted for Appearance Approval. Using the boundary sample tags the supplier shall submit marked boundary samples with the PPAP. Approved boundary samples shall be retained by the supplier for the life of the project.

#### **15.4.5 Process Potential Studies**

As defined in Section 9.9, Process Potential Studies shall be submitted as part of the PPAP package. Special forms are not required; however, the characteristics being evaluated should be clearly identified on each report.

#### **15.4.6 PSW – Part Submission Warrant (See Forms)**

The PPAP Summary page shall be completed and sent as the first page of the PPAP package. Plastic



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Components must include the following in the summary area: Tonnage, Cavitation (Ex 1+1=2 cavity), Part Wt. (Ex .01 (LH)+.012 (RH)+.02 (Sprue)=.042 lb. Shot Wt.) and Shot Cycle Time.

When samples are resubmitted due to corrections made to non-conforming areas, only the corrected area and any other dimensions affected by the correction to the original submission need be checked.

The supplier shall retain all Sample Reports and sample parts (except those submitted to NAL with PPAP) until the end of the project life, which includes service life.

Note: If the PSW is to be sent by email, NAL requires the person who would normally sign the PSW for declaration of compliance (per AIAG PPAP manual), be the person who sends the email to NAL.

### 15.5 Shipping PPAP Samples

The completed PPAP package shall be sent to the Supplier Quality Engineer using the Special Shipment Identification Tag.

**\*\* FAILURE TO SUBMIT PROPER DOCUMENTATION AS DESCRIBED IN THIS PROCEDURE MAY RESULT IN A REJECTED PPAP AND (if applicable) A DELAY IN PAYMENT FOR PRODUCTION TOOLING.**

Questions regarding the sample submission procedure should be directed toward the responsible NAL Supplier Quality Engineer or NAL Buyer.

### 15.6 Sample Status Definition

The supplier will be notified by NAL Purchasing or NAL Supplier Quality Engineering as to the disposition of submitted samples. The disposition will meet one (1) of the following criteria:

#### 15.6.1 Approved

The disposition of “Approved” indicates that the supplier has met all NAL requirements and may begin shipment. This shall include all functional testing required by NAL’s Product Engineering group.

#### 15.6.2 Rejected

The disposition of “Rejected” indicates that the supplier has failed to meet NAL requirements as specified and cannot begin shipment. Corrected samples shall be submitted and approved prior to any shipment.

#### 15.6.3 Provisional Approval

The disposition of “Provisional Approval” permits the shipping of parts on a limited time or piece basis.

A “Provisional Approval” status is generally issued in the following categories:



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- Parts pending additional inspections and/or tests, such as laboratory requirements of other qualifications under assembly conditions. Additional samples are not generally required.
- Parts that do not conform to specifications for some minor characteristic, and although not desirable, may be used without rework and would not affect durability or performance. Corrected samples will be required.

A part covered by a “Provisional Approval” that is not corrected is automatically in a “Rejected” status after the time frame or quantity designated on the Provisional Approval is exceeded. No additional shipments are authorized unless superseded by an approval or an extension of the “Provisional Approval”.

## 16.0 Supplier Packaging and Shipping Guidelines

The packaging guidelines in this section are to inform NAL suppliers of the general packaging and shipping requirements, which are necessary for the North American Lighting Production System. The goal of the North American Lighting Production System is to provide the customer with a quality product at a competitive price.

Just-In-Time Production and Zero Defects at North American Lighting does not allow for defective parts due to poor packaging or shipping methods, nor does it allow for the waste in handling of non-standard packaging materials.

### 16.0.1 Missing or Damaged Packaging Procedure

Suppliers are to complete a visual check of packaging inbound from NAL to confirm that all packaging materials received are complete and without damage, reference the Packaging Approval Form if there is any uncertainty. Suppliers are to notify the NAL Supply Chain Specialist of any missing or damage packaging with specific details;

- What is missing?
- How many?
- Pictures.

The NAL Supply Chain Specialist will provide direction to the Supplier concerning how to proceed with any missing or damaged packaging. Damaged packaging returns to NAL must be identified with ‘Red Tags’ (see table A.) showing the ship to name and description of the damage. All repairs to returnable packaging will be completed by NAL or a NAL designated repair source. Suppliers shall not modify or alter any returnable packaging without prior written approval of NAL.

## 16.1 Package Design

All part quotations are to include expendable and/or returnable packaging. Approval of the packaging design is the responsibility of NAL ME, QE, PM, SQE with the support of the Purchase Part Packaging Engineer. However, NAL approval does not waive Supplier liability for packaging design.



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Package design shall conform to the minimum container standards described in these guidelines and must meet NAL timing. NAL suppliers do not develop the packaging, but must follow/understand the need as this should be a part of their pre-production activity.

Packaging shall conform to all government and transportation rules and regulations.

The package shall deliver the part to the point of use, in a production ready and damage-free condition, assuming normal handling in transportation, storage and in-plant movement.

Packaging shall be designed to deliver and present parts in a condition that does not result in part quality degradation. Packages shall have sufficient vertical strength and stability to a maximum height of 50 inches from floor to the highest point, unless previously agreed upon by NAL. Package design and parts count shall not vary between shipments.

## 16.2 Package Material

Whenever possible, recyclable material should be used; such as, corrugated paper, reusable containers, etc.

Plastic material shall be labeled with a code in accordance with “The Society of the Plastic Industry” (SPI) guidelines and/or in accordance with local government regulations, which may apply.

All fiberboard containers, trays, caps and multi-wall tubes shall have a box maker’s certificate with bursting strength or ECT visible on the assembled containers.

Packaging for ESD sensitive items must meet appropriate ESD packaging requirements; formed trays with part specific cells that protect components from damage and contamination. The tray length dimension *cannot exceed* 21.25 inches long. The preferred tray width dimension should not exceed 13.00 inches, however if component size does not fit within the 13.00-inch width then the tray width can increase to 20.4375 inches. Trays must be produced from insulative or dissipative material, a minimum of .03 thick. Trays must be interlocking when stacked to hold components in specific seated position and to prevent tray movement. Apply a shielding or antistatic poly bag over the stacked trays prior to placing into corrugated shipper. Exceptions to this standard must be approved prior to shipping by Supplier Quality Engineering and Packaging Engineering.

## 16.3 Expendable Packaging

The sourced supplier is responsible for the design and approval prior to NAL SOP for approved expendable ‘backup’ packaging. The design of the expendable pack should reflect the outer dimensions of production packaging and quantity per tote. Half Slotted Containers (HSC) with ‘shoe-box’ style lids are the required container design. Regular Slotted Containers (RSC) are not permitted without special approval from NAL Packaging engineering and Purchasing. Expendable packaging samples and product to be submitted to NAL Packaging Engineering for review and approval. NAL will provide signed approval form to Supplier. Sourced Supplier is required to have approved expendable packaging in place and available for use 90 days prior to NAL SOP.

If expendable packaging is used for a shipment, special authorization should be received from your SCS the day prior to shipping product. The SCS will provide approval via email.



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If the supplier does not have an approved alternate pack they must notify SCS and provide a picture of planned expendable with dimensions and qty per pack to be used to their SQE and Buyer for review.

### 16.3.1 Handling

Containers shall be designed to allow manual handling, including bundles, and shall not exceed 40 pounds (18.16 kg) in weight, even if palletized. Where part size allows, containers should be utilized that will fit the North American Lighting racking system. Maximum dimensions are 24 in. x 15 in. x 11 in. (60.96 cm x 38.10 cm x 27.94 cm). Preferred dimensions are 24 in. x 15 in. x 9 in. (60.96 cm x 38.10 cm x 22.86 cm).

Maximum gross full pallet weight of mechanically handled expendable unit loads shall not exceed 2,000 pounds (908 kg).

Unique packaging requirements dictated by a part (i.e. excessive part oiliness, rust prevention, weight or fragility) not covered by these specifications are the responsibility of part suppliers and shall be approved by the NAL Manufacturing Engineering.

Decorative moldings shall be packaged to prevent part-to-part contact within and between layers.

Carton quantity will be based upon NAL usage and should be estimated at 2 hrs. worth of daily need or in a multiple of daily usage if feasible.

### 16.3.2 Pallets and Top Caps

Unless otherwise approved, the standard NAL pallet (45"x48" w/ max height of 50 shall be utilized to help create uniformity in storage and disposal. All pallets are to be made of durable returnable and recyclable materials unless other special packaging specifications are authorized. In addition, all pallets must have an approved top cap. If standard top cap is not available, please contact your SCS.

Palletized loads shall be adequately secured to the pallet. The preferred method of palletizing is plastic banding. However, plastic stretch-wrap may be substituted, if necessary. **Under no circumstances will metal banding be acceptable.**

### 16.3.3 Unique Containers

Full pallet sized cartons shall not overhang their base and shall be banded to the pallet.

All Half-Slotted Carton (HSC) style boxes (corrugated cardboard container which is not completely covered on the top) shall be secured with a cover.

In some cases, small component parts such as fasteners, plastic clips, etc. may be required to be packaged inside a plastic bag inside the container. This requirement is to be determined at PPAP by the NAL Supplier Quality Engineering Department.



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## 16.4 Returnable Containers

Due to environmental, cost and quality considerations North American Lighting encourages the use of returnable packaging. This portion of the guidelines will assist in the development of returnable packaging.

### 16.4.1 Standard Containers

Many parts can be shipped in standard containers, which are available and require little or no modification. Some examples include plastic tote boxes and steel/wire racks. Contact the Purchasing Department for additional information and recommended containers.

### 16.4.2 Unique Containers

Frequently, parts may require a unique or specialized packaging design due to part characteristics, automated handling, ergonomics, etc. Special characteristics include part geometry, fragility, cleanliness, etc., requirements.

Specialized packaging can be constructed from various materials, which are dependent upon the part. The most common materials used are plastic, wood and metal. Common examples include plastic trays and pallets, and tubular steel racks. Sizing, when possible, should follow the guidelines stated in the expendable container section (Section 16.3).

Returnable packaging should be made of materials that are disposable or recyclable. Examples of difficult to dispose or recycle materials include thermoset plastics and paint containing lead.

### 16.4.3 Economics

NAL strives to receive packaged parts utilizing the most economical method possible, while, at the same time, maintaining part quality. **It is the supplier’s responsibility to maintain the cleanliness of the packaging to ensure that parts arrive at NAL at the acceptable quality level. The cleaning frequency should be determined at PPAP and is the responsibility of the supplier.**

Economic factors that influence the use of returnable packaging include material, quality, labor, freight, cleaning, disposal, recycling and tooling costs.

## 16.5 Labeling and Identification

NAL has made bar code labels a vital part of its manufacturing process. The following are guidelines for the printing and placement of supplier bar code labels using the Plex portal.

Suppliers must complete the following steps. Not doing so will prevent NAL from receiving the items into Plex and may result in supplier charge backs.

NAL requires that all individual packages (totes, cartons, gaylords, housing racks, etc.) have clear, identifiable labels affixed to them in an easily accessible and consistent location.

Plex Portal – Suppliers using the Plex portal must select “Ship” in order for the items to be placed



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into “Supplier Shipped” status.

EDI - Suppliers using EDI must send an ASN within 15 minutes of the truck leaving.

### 16.5.1 Contents Identification

#### Label Requirements

- All suppliers’ in-house labels must be removed prior to shipping to NAL facilities.
- Labels should be printed using an output resolution of 200 dpi. Using a higher or lower output resolution may cause the print to be too large or small for the label.
- Only one 4” X 6” bar coded label per container (tote, carton, etc.) shall be placed in an easily accessible and consistent location (i.e. outside corner or card holder). All palletized containers must have labels that are accessible (without removing shrink wrap, straps or lids) and able to be scanned.
- If returnable tote used product label must be placed on the front and back of the short side of each container using a Kanban holder (see below example).



- In the event that an additional label/tag/note/placard is required, it must be placed in a location that does not interfere with the ability to scan the bar code. Alternate packaging does not always contain the same quantity of materials as standard packaging

#### Label Specifications

- Part No. (P) - This area contains a human readable NAL part number and is auto-populated when printed from Plex.
- Quantity (Q) - This area contains a human readable quantity for the labeled container and is auto-populated when printed from Plex. When shipping in alternate packaging, this quantity must be changed manually if different from the standard packaging quantity.
- Serial # (S) - This area contains a human readable serial number and scannable bar code. This is auto-populated when printed from Plex. The bar code must be clearly printed and free of any damage or tears. Light print, tears or damage to the label may prevent the bar code from being scanned.
- Supplier Code (V) - This area contains the human readable supplier name and is auto-populated when printed from Plex.
- P.O. # (N) - This area contains the human readable purchase order number and is auto-populated when printed from Plex.



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See below example (for illustrative purposes only, not to scale)

PART NO. (P) <b>123 456-78</b>		 North American Lighting, Inc. A <b>KOHLER</b> Group Company	
		QUANTITY (Q)	PIECE(S)
DESCRIPTION: CORRUGATED HALF SLOTTED CONTAINER			
SHIP DATE	SERIAL# (S)	P000123	
TRACKING NUMBER			
SUPPLIER CODE (V)	SHIP FROM:		
P.O.# (H)	SHIP TO: PARIS PLANT (PAR) 2277 S. MAIN ST. PARIS IL 61944		

### 16.5.2 Returnable Container Labeling

Return to Identification, must be placed on all four sides of returnable container and include the following detail:

- Must have Return to “Supplier XYZ”
- Product Description
- Product Part Number



### 16.5.3 Special Shipment Identification Tags

Special Shipment Identification Tags shall be required to identify all irregular shipments (pre-production samples, reworked material, etc.) and should, also, be used to identify the first 3 shipments of new product. These tags are available from your SQE, Buyer or SCS in addition to the supplier portal.



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## 16.6 Shipping Documents

All shipments shall be accompanied by a Bill of Lading and a Packing List. The packing list must be located on the shipment in plain sight of the unloader. In addition, an Advanced Shipping Notice (ASN) must be sent to NAL at the time the shipment leaves the suppliers dock.

All invoices and packing lists shall include:

- North American Lighting, Inc. Part Number
- Purchase Order Number and release number (if applicable).
- Total Quantity shipped per part number
- Part Description
- Number of cartons shipped.

The Packing List number shall be referenced on all invoices

Only one (1) document shall bear the title “Packing List”.

If possible, invoices and packing lists should be identical. Bill of Lading should be referenced on both the packing list and invoice.

## 16.7 Freight Preparation

- All labels must be on the short side of the container and visible on the outside of the skid
- When possible, like part numbers should be grouped together and contained on the same pallet facing the same direction
- All staged pallets must meet the standard size requirements noted in 16.3.2
- All containers must be palletized, so the pallet is stable and secure
- When shipping the NAL the final destination must be clearly identified on the 45” side of each pallet. Multiple locations should NEVER be placed on the same skid unless authorized by SCS or buyer.
- Skids containing more than one-part number must be identified as mixed labeled as a “mixed” pallet and include a Mixed Pallet Manifest (Doc XXX).



- Labels should be placed in Kanban holder. See example.



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- Packing List must be clearly visible on the outside of the skid

## 16.8 Transportation Guidelines

### 16.8.1 Truck Shipments

1. Freight must be staged prior to dock time.
2. In applicable, sort freight by final destination. Load the freight for the last stop first and the first stop last. Contact SCS for loading sequence if unknown.
3. Stack freight as necessary to ensure safe handling and transport.
4. Stack freight as necessary to ensure safe handling and transport.
5. All heavy freight must be placed on the bottom of the stack.
6. Expendable freight may stack on top of heavy freight only when a top cap is used.
7. Expendable packaging must be placed on top of layer of skids when stacked with returnable.

### 16.8.2 Transportation Requirements

The transportation of product from Supplier to NAL is determined by your Buyer and should be known by your SCS. If you have question or concerns, please contact one of these persons.

### 16.8.3 Small Packaging Shipments

1. Over 150 lbs less than 5000 lbs or 12 linear feet.
2. Under 150 lbs the preferred small shipment carrier is Fed Ex Ground (less than 150 boxes).
3. Utilize a plastic band to connect all small boxes when possible. This will ensure product is delivered at the same time. Also, you can place smaller boxes inside a larger box.
4. Each small package shipment must contain a copy of a packing slip clearly identified on the OUTSIDE of the box whether shipping LTL, Fed Ex or another method of shipment.

## 16.9 Conclusion

Although, it is the responsibility of the supplier to design packaging for their products, North American Lighting, Inc. is interested in obtaining the most economical packaging, transportation and handling costs, while ensuring part protection and quality.



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### 17.0 Potential Failure Mode and Effect Analysis (PFMEA)

The supplier shall have a PFMEA for each component that is manufactured and shipped to NAL, which will ultimately be a part of a finished lamp that is to be shipped to the OEM's. Refer to the latest edition of the AIAG Manuals for this format.

### 18.0 NAL SPC Policy

#### 18.1 Development of Pp and Ppk indices for PPAP Submissions

Stability shall be indicated prior to the capability indices. The calculation is to be based on criteria established during design review.

Stability for Ppk is defined by NAL as having no out of control points or trends based on a minimum of 25 subgroups of 3 consecutive pieces each; utilizing short run X-R Chart format.

$Ppk \geq 1.67$  is required for submission to the customer unless otherwise approved by that customer.

#### 19.2 Development of Cp and Cpk indices for production

The supplier is to utilize control limits developed from the Ppk study for the first 25 subgroups, then recalculate the control limits from actual production data.

Stability shall be indicated prior to the capability index calculation.

Stability for Cpk is defined by NAL as having no out of control points based on a minimum of 25 subgroups of 3 consecutive pieces each

Calculate Cp and Cpk using this data (25 subgroups of 3 consecutive pieces each, minimum). A Cpk of  $\geq 1.33$  is required unless otherwise approved by the customer.

#### 19.3 Ongoing process and product monitoring

Suppliers are to follow the rules established below (Table 2).

NAL defines control of ongoing monitoring as having no points outside of the control limits and no adverse trends.

NAL requires all runs, trends, and out-of-control points to be properly identified and documented.

NAL requires countermeasure action plans for any out-of-control on non-capable processes.

The Cpk and Control Limits are to be recalculated for any of the following reasons: upon significant process change; quarterly or necessity for continuing control.

**Note:** For additional information regarding standard automotive SPC practices, please, refer to the



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Fundamental SPC Reference Manual published by AIAG.  
15.2

TABLE 2			
NAL SPC POLICY			
Ongoing Process and Product Monitoring Chart			
ACTIONS ON THE PROCESS OUTPUT			
POINT	Cpk History < 1.33	Cpk History 1.33 – 1.67	Cpk History > 1.67
<b>IN CONTROL</b>	- Accept production - Action plan required to improve capability	- Accept production	- Accept production
	Cpk History < 1.33	Cpk History 1.33 – 1.67	Cpk History > 1.67
<b>OUT-OF-CONTROL</b>	- Immediate action plan required to correct special cause - Immediate sample of stock produced since last in-control point (twice as many as subgroup size min.) to determine required action - Action plan to improve capability required	- Immediate action plan required to correct special cause - Immediate sample of stock produced since last in-control point (twice as many as subgroup size min.) to determine required action	- Immediate action plan required to correct special cause
	< 1.33		> 1.67
<b>OUT-OF-CONTROL ONE OR MORE OUT OF SPEC.</b>	- Immediate action plan required for special cause - 100% sort all in-house stock for the out of spec. characteristic - Double sample frequency (i.e. current 3 pcs/4 hrs go to 3 pcs/2 hrs until control re-established) - NAL to reject shipment if the parts have not been 100% inspected for the out of spec characteristics at the supplier		



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Table 3 NAL SUPPLIER CHARGEBACK				
Account Code	Non-Compliance	Fee	Example	Contact
NC001	Downtime	\$75/hour per employee on the line	5 operators for 3 hours = \$1125	Your Buyer
NC002	Overtime	\$100/hour per employee on the line	2 operators for 1 hour = \$200	Your Buyer
NC003	Receiving Discrepancy	\$250 per incident		Your Buyer
NC004	SQC	\$250 per incident		Your Buyer
NC005	Sorting at NAL	\$50/hour for NAL	2 people for 3 hours = \$300	Your Buyer
NC006	Sorting at NAL Customer	As debited from the customer	Customer charges \$5000, supplier at fault pays \$5000	Your Buyer
NC007	Scrap	Current cost per part times number of parts scrapped	100 parts scrapped, \$2.3089 per pc = \$230.89	Your Buyer
NC008	Label Discrepancy	\$250 per incident		Your Buyer
NC009	Plex Label	\$250 per incident		Your Buyer
NC010	Additional Skids	\$50 per number of add'l skids	Truckload of product (52 skids) = \$2600 (in addition to Plex Label incident fee)	Your Buyer
NC011	RMA	PO Value		Your Buyer
NC012	Freight Chargeback	As debited from the 3PL Provider		Freight Analyst
NC013	Accounting / Administrative Fees	\$50 per hour per Employee	Repeated offensives	Your Buyer



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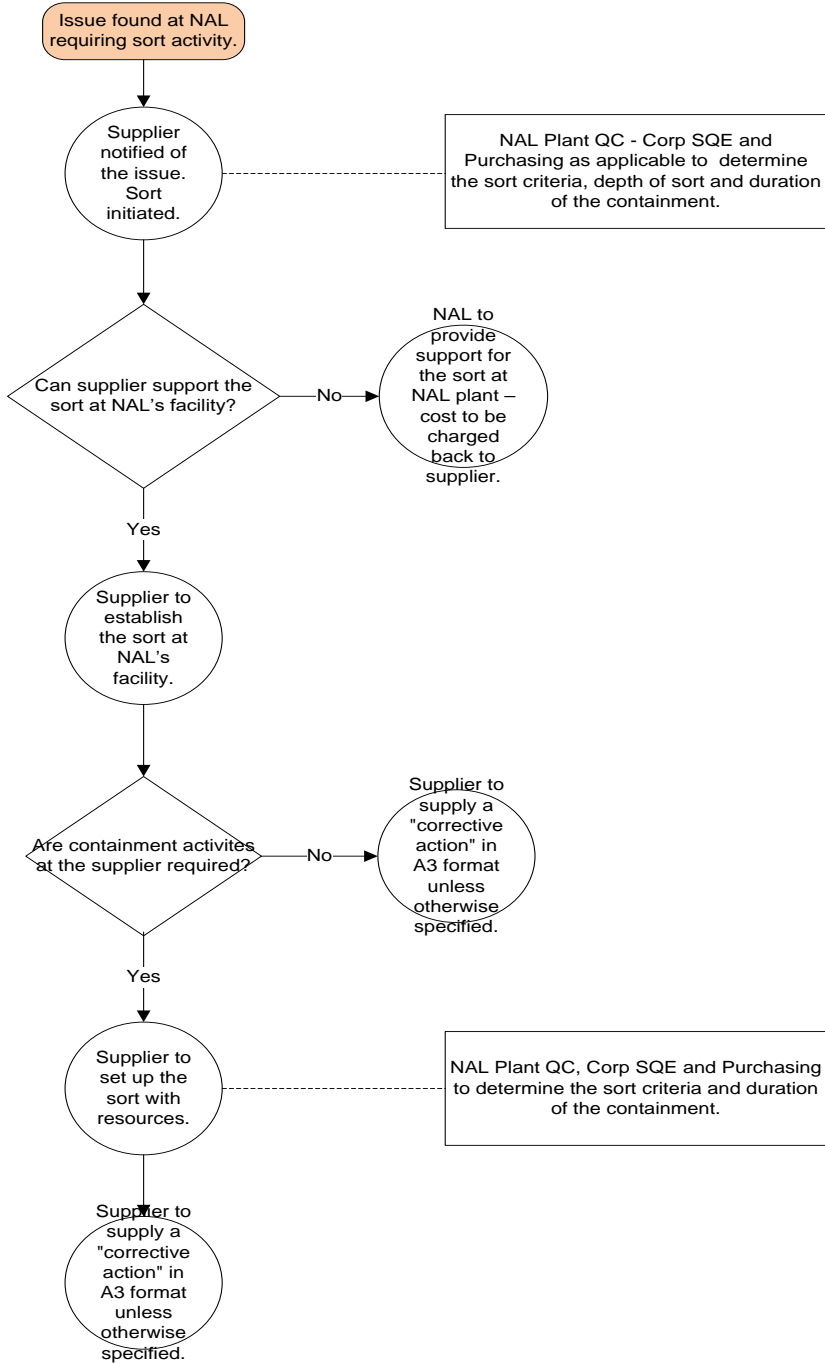
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### Supplier Containment Flowchart



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## GLOSSARY

### **CALIBRATION:**

The function of determining the accuracy of measuring devices and adjusting such devices to indicate exact conditions as established by standards of known accuracy.

### **CHARACTERISTIC:**

An individual specification on a part or product.

### **CONTAINER LABEL:**

This label is to be used on a returnable container that is meant to be returned to the supplier. This label must include the following information: Return to Supplier XYZ, Part Number and description of part.

### **CRITICAL CHARACTERISTIC:**

A characteristic which, if not within specifications, may affect the performance of vital components and systems, result in major repair expense or result in a hazard for the individual assembling the product.

### **CHECKS AND TEST:**

The evaluation of conformance of characteristics to prescribed limits and standards.

### **DEFECT/DEFECTIVE:**

Nonconforming parts or products. Any variation from or failure to meet specifications.

### **FUNCTIONAL TEST:**

The evaluation performed on samples to ensure they assemble properly, conform to operational requirements, meet NAL engineering specifications and are adaptable to production usage. NAL will be responsible for final determination of functionality.

### **HSC:**

Half-slotted carton.

### **INITIAL SAMPLE:**

A small quantity of parts made from production tooling and set-up and requiring NAL approval prior to volume shipment.

### **INSPECTION:**

Examination of parts or products to determine conformance to specifications.

### **INSTRUCTIONS:**

Written documents which detail operations and procedures to be performed.

### **KANBAN:**

A small card that is the day control tool for Just-In-Time Production. The KANBAN provides instructions for production and conveyance of product.

### **LOT INSPECTION:**

Lot inspection is the inspection performed on random samples taken from an isolated aggregation of parts, which are essentially alike and which were produced from the same production processes. Lot size shall



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normally represent parts produced during a specific operating period of up to eight hours or a working shift. Production rates shall be a determining factor in establishing lot size, which shall be acceptable to the NAL representative.

**MAJOR CHARACTERISTIC:**

A characteristic, which if not within specification, is not likely to reduce materially the usability of the item for its intended purpose or is a departure from established specifications or standards having little bearing on the effective assembly performance, function or customer acceptance of the item.

**PROCESS CAPABILITY:**

Refers to the normal behavior of a process when operating in a state of statistical control.

**PROCESS CAPABILITY STUDY:**

Refers to the systematic study of a process by means of statistical control charts in order to discover whether it is behaving naturally or unnaturally.

**PROCESS CONTROL:**

The establishment and maintenance of all of the circumstances necessary to ensure that any variation in product quality beyond the established limits for the process is attributable to change causes only, and that any such variations resulting in end product nonconformance will be detected and corrected on all products produced prior to shipment of finished materials.

**PROCESS CHANGE:**

As used in this specification, any change in the processing concept, which could alter the design requirements or durability of the part. This will include new, different or rehabilitated production machinery or equipment which might cause the characteristic of the part being processed to change in a way that would not be measurable in the normal inspection procedure, the use of Engineering approved alternate materials and new process concepts, including major changes in the sequence of operations.

**PURCHASE AGREEMENT:**

Contract arrangement between NAL Purchasing Department (Buyer) and Source (Seller) detailing specific conditions or requirements that each party is obligated to meet.

**RANDOM SAMPLE:**

A sample selected in a manner whereby any given item in the lot has an equal chance to be examined.

**RECORDS:**

Documented evidence of performance.

**SOURCE:**

A person, company or organization which signs a purchase agreement or contract to supply materials to NAL.

**SPECIFICATIONS:**

The limits established which describes the requirements for conformance to all characteristics.

**SUBCONTRACTOR:**

A person, company or organization to which a source sublets processing.



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**IATF 16949/ISO 9001:**

All references to these items assumes the most current standard.

**ACRONYMS**

<b>AIAG</b>	Automotive Industry Action Group
<b>APQP</b>	Advanced Product Quality Planning
<b>ASTM</b>	American Society of Testing and Materials
<b>CMM</b>	Coordinate Measuring Machine
<b>EOL</b>	End Of Life
<b>ESD</b>	Electrostatic Discharge
<b>HSC</b>	Half-Slotted Carton
<b>IMDS</b>	International Material Data System
<b>N/G</b>	Not Good
<b>OEM</b>	Original Equipment Manufacturer
<b>PCP</b>	Process Control Plan
<b>PFMEA</b>	Process Failure Mode and Effects Analysis
<b>PPAP</b>	Production Part Approval Process
<b>PPM</b>	Parts Per Million
<b>PSW</b>	Product Submission Warrant
<b>RPN</b>	Risk Priority Number
<b>SAE</b>	Society of Automotive Engineers
<b>SOP</b>	Start Of Production
<b>SPC</b>	Statistical Process Control
<b>SPI</b>	Society of the Plastics Industry
<b>SQC</b>	Supplier Quality Concern
<b>SQE</b>	Supplier Quality Engineering



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**Revision History**

Revision	Effective Date	Description of Change	Approval Authority
A	6/1/05	Initial Release	B. Griffith
B	5/7/08	Contingency Plan	B. Griffith
Ca	8/1/08	PSW electronic submission - signatures	B. Griffith
D	9/6/08	Containment Flow Added	B. Griffith
E	12/18/09	At Management system requirements	B. Griffith
F	3/26/10	AIAG B-3 changed to B-10 Labeling	J. Koehler
G	4/16/12	Change to record retention time – customer requirements	J. Koehler
H	7/10/13	Page 10 – inspection requirements for critical points.	J. Koehler
I	5/13/14	5.2 Conformance to specifications	R. Snyder
J	8/12/14	Special Tagging – Non-conforming at supplier	R. Snyder
K	4/21/15	7.2 Addition of NAL SUPPLIER PROCESS CHANGE REQUEST: PLAN AND AUTHORIZATION form; Added verbiage to instruct Suppliers of the requirements of the form	J. Beem
L	1/14/16	Changes to the following sections: <ul style="list-style-type: none"> <li>• 8.4 Record Retention</li> <li>• 9.2 Pre-Qualification of New Suppliers &amp; Registration Requirements for all Suppliers</li> <li>• 13.0 Quality System Assessment Reference Materials</li> <li>• 15.4.6 PSW Part Submission Warrant</li> <li>• 16.0 Supplier Packaging &amp; Shipping Guidelines</li> <li>• 16.1 Package Design</li> <li>• 16.3 Expendable Packaging</li> <li>• 16.3.1 Handling</li> <li>• 16.3.2 Pallets and Top Caps</li> <li>• 16.4.3 Economics</li> <li>• 16.5.1 Contents Identification</li> <li>• 16.5.3 Special Shipment Identification Tags</li> <li>• 16.6 Shipping Documents</li> <li>• Glossary- Added Container Label, TS16949/ISO9001</li> </ul>	M. McNeely J. Beem N. Stratman



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		<p>Sections removed</p> <ul style="list-style-type: none"> <li>• 16.4.1.1 NAL Owned Standard Returnable Container</li> <li>• 20.0 Pallet Drawings</li> </ul> <p>Sections added</p> <ul style="list-style-type: none"> <li>• 9.10.1 HVPT</li> <li>• 16.5.2 Returnable Container Labeling</li> <li>• 16.7 Freight Preparation</li> <li>• 16.8 Transportation Guidelines</li> <li>• 16.8.1 Truck Shipments</li> <li>• 16.8.2 Transportation Requirements</li> <li>• 16.8.3 Small Packaging Requirements</li> </ul>	
M	6/1/2016	Added section to 6.0 “A Rank SQC” instruction	J. Beem
N	7/1/2016	Added section to 6.0 “Reaction to receipt of SQC”	J. Beem
P	7/27/2016	<p>Added section to 2.1 “Criteria for supplier selection”</p> <p>Added number of SQCs to section 2.2</p> <p>Added Part Rank definition to section 3.1</p> <p>Added timing to HVPT to section 9.10.1</p> <p>Added timing of PPAP submissions to section 9.11</p> <p>Added Section 14.1.1 Safe Launch Control Plan</p> <p>Added ESD packaging requirements to section 16.2</p> <p><b>**Note: NAL does not use rev O – skip to P</b></p>	J. Bayless J. Beem
2/7/17	2/7/2017	<p>Section 2.1 – changed word “three” to “five”</p> <p>Section 3.2 – added word “product”</p>	J. Beem
3/7/17	3/7/2017	<p>Section 16.3 – added requirements for expendable packaging</p> <p>Section 2 – Added Table and verbiage on direction for supplier chargebacks</p>	K Young / J Beem / R Holliman
4/11/17	4/11/17	Supplier Evaluation and Performance and Management Review records are to be kept 20 yrs. was 10 yrs.	Jerry Beem
8/18/2017	8/18/2017	<b>Section 6.0 – Added “through PLEX” verbiage to Corrective Action</b>	Jerry Beem
11/20/17	11/20/17	<b>Section 2.1 – Updated from TS to IATF compliance</b>	R Holliman



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5/7/2018	5/7/2018	Section 6.1 – Added verbiage requiring updates to PFEMA/CP for SQCs Added Section 6.2 – Returned Material Authorization Section 7.2 – Added verbiage for PCR Section 14.0 – Added verbiage to PCP Deleted Section 14.5 for redundancy Deleted Section 18.0 for redundancy	J. Beem
	10/16/2018	<i>Revision History Changed to Electronic form in DCS</i>	J. Beem
3-11-19	3-11-2019	<i>Updated ISO9000 to ISO 9001</i>	J. Beem
3/18/19	3-18-2019	<i>Updated TS16949 to IATF 16949</i>	J. Beem



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