NORTHERN STAMPING, INC.

KEY SUPPLIER QUALITY MANUAL

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A. Goal

The goal of this Manual is to promote the development and effective implementation of a Quality Management System at all Northern Stamping, Inc. (hereafter "NSI") Key Suppliers.

This System is to be built on the following principles:

- Process Approach (Plan-Do-Check-Act Cycle, Risk-Based Decision-Making)
- Built-In Quality (BiQS)
- Product Life Cycle Management
- Product Safety
- Continual Improvement
- Defect Prevention
- Waste Minimization

B. Confidentiality

All information gained from interactions with NSI is to be held strictly confidential.

C. Purpose and Applicability

This Manual describes NSI's Quality Management System expectations for all Suppliers of production material, parts, and services that directly affect parts shipped to NSI's Customers (designated as "Key Suppliers" hereafter). NSI is committed to working with Key Suppliers in order to provide the highest quality and service at a competitive cost that benefits the final Customer, the supply base, and themselves.

D. Approach

NSI is committed to operating within the guidelines of IATF16949, and therefore requires Key Suppliers to be third-party certified to the current ISO9001 Quality Management System Standard at a minimum. Suppliers who perform laboratory work must be third-party certified to ISO/IEC/EN17025.

E. Key Suppliers' Responsibility

Key Suppliers must:

1. Notify NSI's Supplier Quality Engineer (440.821.0239) when their contacts for NSI have changed.
2. Stay current with revisions to this Manual when notified of changes. The Manual is posted on NSI's website (northernstamping.com, Suppliers page), and revisions are noted in the Revision History at the end of the Manual.

F. Zero Defects Policy

NSI has a Zero Defects Policy, and does not accept any shipments containing nonconforming or defective material, parts, or services. Key Suppliers are required to monitor their shipments to ensure a quality level of zero parts defective.

SECTION 1.0: KEY SUPPLIER APPROVAL AND EVALUATION PROCESSES

1.1 Key Supplier Approval Process

1.1.1 Prior to an initial purchase, all proposed Key Suppliers are considered to be "Prospects".

1.1.2 The Materials Manager issues and collects the NSI Key Supplier Survey file.

1.1.3 The Supplier Development Team reviews the completed file, along with other information as detailed below, and determines whether to continue Supplier development with this Prospect.

- **Quality System Certification:** Third-Party certification to the current ISO9001 Quality Management System Standard is a requirement of Key Suppliers. If a Prospect Key Supplier is qualified in every way except Quality System Certification, NSI mitigates risks by determining status relative to its Small Suppliers designation, and/or conducts a second-party audit of the Prospect, or permits the Prospect to self-certify. If a Key Supplier's QMS certification expires or is cancelled/withdrawn by their Certification Body, NSI will establish and implement a plan for second-party audits or Key Supplier self-certification to ensure continued compliance with IATF16949 until such time as the Key Supplier is recertified.
- **Customer-Required Suppliers:** If the Key Supplier is a Customer-Required Supplier, they are added to the Approved Key Supplier List without further investigation.
- **PPAP Submission:** All Prospect Key Suppliers are required to maintain and submit PPAPs at the Submission Level requested by NSI.
- **Key Suppliers who will supply products/services for FCA-related products, and are deemed "High Risk" by FCA or NSI:** NSI conducts an on-site Process Audit or equivalent, and a Production Demonstration Run (PDR).

1.1.4 Following the initial purchase, the Supplier Development Team determines if the Prospect's initial performance was satisfactory, and if so, they are added to the NSI Approved Key Supplier List. Prospects deemed "Unsatisfactory" are not added to the List, but may be targeted for development so that they may be added at a later time.

1.1.5 The Supplier Development Team may remove a Supplier from the Approved Key Supplier List for any of the following reasons:

- Unacceptable quality performance on materials/services.
- Unacceptable delivery on materials/service.
- NSI no longer requires the Key Supplier's product.
- Unprofessional business practices.

1.2 Key Supplier Performance Rating System

In support of NSI's Key Supplier Development process, NSI monitors Suppliers with respect to the following criteria:

Rating Criteria	*Calculation or Description*	*Value Range*	*Points Attained*
Quality	No. of Defective Units ---------- X 1,000,000 Total Units Received	**Less than 100 ppm**	**20**
		Less than 500 ppm	**14**
		Greater than 500 ppm	**0**
On-Time Delivery	On-Time is defined as up to 5 days early through 4 days late	**Equal to or Greater than 98%**	**20**
		Between 95 and 98%	**14**
		Less than 95%	**0**
Customer Disruptions and Special Status Notifications	No. of Occurrences of Controlled Shipping, New Business Hold, Recalls, Yard Holds, Stop Ships, Field Actions	**0 Occurrences**	**40**
		1 or more Occurrences	**0**
Premium Freight	No. of Occurrences	**0 Occurrences**	**10**
		1 Occurrence	**5**
		Greater than 1 Occurrence	**0**
Dealer Returns, Warranty	No. of Occurrences	**0 Occurrences**	**10**
		1 Occurrence	**5**
		Greater than 1 Occurrence	**0**

OVERALL RATING	**Preferred Supplier: Thanks!**	**Greater than 80 points**
	Adequate Supplier	**Between 60 and 80 points**
	Marginal Supplier: Corrective Action Needed	**Less than 60 points**

Rating Explanations:

1. Unit = part, pound, or Corrective Action Request, as applicable
2. Late = Delivered 5 or more days after the Requirement Date
3. Early = Delivered earlier than 6 days prior to Requirement Date

Supplier Performance Reports are transmitted to the Key Supplier's designated contact(s) via email on a quarterly basis. For Key Suppliers who score less than 60 points, NSI's Supplier Quality Engineer will send the Supplier Assessment form (including Action Plan) for completion and return to NSI's Supplier Quality Engineer. If there are any questions regarding the reports, contact NSI's Supplier Quality Engineer at 440.821.0239.

SECTION 2.0: MANUFACTURING PROCESS PLANNING

2.1 Quality Planning

An effective Quality Management System uses multi-disciplinary resources for Advanced Product Quality Planning (APQP). The Automotive Industry Action Group (AIAG) has established the basis of an effective quality planning system in the Advanced Quality Planning and Control Plan reference manual.

NSI expects each Key Supplier to use Advanced Product Quality Planning and promote continual improvement. This planning must include identification of product requirements and technical specifications, logistical requirements, determination of manufacturing feasibility and acceptance criteria, project planning, education and training of employees, employee involvement, and the tracking, analysis and reporting of cost of quality data. All Quality Planning efforts must focus on error prevention rather than detection. Suppliers are also encouraged to implement the applicable phases of Product Life Cycle Management (see Appendix I for an overview).

Feasibility reviews must be conducted prior to committing to supply products/services to NSI, and Key Suppliers must ensure that personnel with process design responsibilities are competent to achieve requirements.

Key Suppliers must review and approve NSI purchase orders, and communicate promptly if purchase orders do not match Key Supplier commitments. Should NSI's requirements for the Key Supplier be revised, the Key Supplier must again review and approve them for feasibility, revise all relevant documents, and inform all relevant employees of the changes.

2.2 Process Design and Development

In order to design their manufacturing processes, Key Suppliers must have a documented process that includes the identification, documentation and review of product and process requirements during quoting and other subsequent interactions with NSI. Suppliers must have the ability to communicate data in NSI's specified computer language(s), and these requirements may include:

- Functional and performance product requirements, including Special Characteristics (see Section 2.3 "Special Characteristics" below)
- Characteristics identified as a result of the Key Supplier's knowledge of their products and processes
- Risk assessments relative to input requirements, including potential consequences of failure due to the nature of products and services
- Targets for conformity (including product preservation, reliability, durability, serviceability, productivity, process capability, health, safety, ergonomic, recycling and other environmental impacts, developmental timing, and cost)
- Process controls to be implemented
- Boundary and interface requirements
- Documentation requirements
- Identification, traceability and packaging requirements
- Consideration of process design alternatives
- Statutory and regulatory requirements, and codes of practice to which the Key Supplier has committed
- NSI requirements, if any.

Key Suppliers must also have a documented process for the identification, documentation and review of the manufacturing process design outputs, and documentation must be in terms that enable verification against manufacturing process design inputs. These outputs include, but are not limited to the following:

- Specifications and drawings
- Special Characteristics for product and manufacturing process
- Identification of process inputs that impact characteristics
- Tooling and equipment to be used for process and control, including capability studies

- Process flow charts/layouts, including linkages between product, process, and tooling
- Capacity analysis
- Process Failure Mode and Effects Analyses (PFMEA) – see Section 2.5 "Risk Mitigation" below
- Maintenance plans and instructions
- Control Plan(s)
- Process approval acceptance criteria
- Quality, reliability, maintainability and measurability data
- Results of error-proofing identification and verification, as appropriate based on risk analyses
- Methods of rapid detection, feedback and feed-forward, and correction of product and manufacturing process nonconformities.

Process design and development processes must be conducted using an established methodology that ensures that verification reviews are conducted to ensure outputs meet inputs, outputs are validated to ensure they meet the intended use requirements, and actions taken accordingly to address any issues identified during the reviews.

During product and process design and development, measurements such as risks, costs, lead times, and critical paths must be defined, analyzed, and reported, with summary results serving as an input to Management Review. When required, program status reports must be sent to NSI.

Also, if required by NSI, Key Suppliers must have a prototype program and related Control Plan, with the same Sub-Tier Suppliers being used as will be used in production, if possible.

2.3 Special Characteristics

"Special Characteristic" is the classification of a product or process characteristic that can affect safety or compliance with regulations, fit, function, performance, requirements, certifications, or subsequent product processing. Key Suppliers must use a multi-disciplinary approach to establish, document, and implement processes to identify Special Characteristics, including those identified by the Customer and risk analyses.

Key Suppliers must conform to NSI requirements for designation, approval, and control and monitoring of Special Characteristics, and they must be detailed in the PFMEA and Control Plan.

For GM Special Characteristics, GMW15049 Key Characteristic Designation System Process applies.

For FCA Special Characteristics, FCA's current Customer-Specific Requirements for IATF applies. Examples include The Shield <S> and also <E> for Safety/Regulatory characteristics, and The Diamond <D> for characteristics that have been deemed key to the function and end-user acceptance of the final product.

Control Characteristics are designated by the approved engineering drawing or process control plan through:

- The application of special symbols or notes on engineering drawings
- Material and process specifications
- Appearance on a control characteristic list
- Characteristics deemed "major" due to the Key Supplier's manufacturing process

All Control Characteristics require demonstrated process capability as described in this Manual.

2.4 APQP Documents

Key Suppliers must submit a Process Flow, PFMEA, and Control Plan in advance of PPAP approval. All documents must carry issue and revision dates, and collectively must include measurement techniques, sampling plans, acceptance criteria, and the reaction plans and escalation process if the acceptance criteria are not met.

2.4.1 Process Flow

Once approved by NSI, the Process Flow becomes the authorized manufacturing method. Any changes to the manufacturing process or product must be communicated to, and approved by NSI prior to its implementation. All related documents/systems must be revised, communicated internally, and available for review by NSI Supplier Quality.

2.4.2 Process Failure Modes and Effects Analysis (PFMEA) (BiQS: GM 1927 36 a Group)

Based on product requirements, process risk must be studied so that prevention and detection controls adequately address the Severity of each risk (those for the Key Supplier, NSI, NSI's Customer, and the end-user) and the Occurrence of each cause.

2.4.3 Control Plan

Key Suppliers are required to develop and maintain Control Plans and submit them to NSI for approval. All Control Plans are to be developed as the result of Process Flow and PFMEA development processes and other organized multi-disciplinary efforts. If required by NSI, the Key Supplier must develop and implement a Control Plan for both Pre-Launch and Production processes. Also if required by NSI, the Key Supplier must provide measurement and conformity data collected during the implementation of either or both Plans.

Control Plans must include the product and process controls used during the manufacturing process, including job set-up verifications, First-Piece/Last-Piece validations as applicable, Special Characteristic monitoring methods, Reaction Plans, and any other requirements requested by NSI.

They must be reviewed and revised as necessary whenever the Key Supplier determines that it has shipped nonconforming product, and whenever a change occurs that affects the product, or manufacturing, supply, measurement or logistical processes.

2.5 Risk Mitigation

During risk analysis, Key Suppliers must identify both risks and opportunities. By addressing both, the Quality Management System can achieve its intended results, enhance desirable outcomes, reduce or eliminate undesirable effects, and foster continual improvement.

Risk Analyses must be performed consistently using a documented process that is based on the AIAG's Potential Failure Mode and Effects Analysis (PFMEA) reference manual or equivalent. Using this process, Key Suppliers can lessen the impact of risk by determining potential nonconformities and their causes, evaluating the need for action to prevent the occurrence of nonconformities, determining and implementing the necessary actions within the Quality Management System processes, recording the actions taken, evaluating the effectiveness of actions taken, and using lessons learned to prevent recurrence in similar products/processes. Actions taken must be appropriate based on the severity of the risk, and at a minimum, lessons learned should be determined from the analysis of product audits, Customer complaints, and scrap and rework data.

A key risk mitigation effort is to maintain a documented Contingency Plan that is appropriate to the severity of the risk and impact to the Customer. At a minimum, the Plan must consider key equipment failures, interruption of product/service supply from Sub-Tier Suppliers, natural disasters, fire, utility interruptions, labor shortages, and infrastructure disruptions (including cyber-attacks). If any situation may impact NSI, reaction plans must include notification to NSI as to the extent and expected duration. In addition, reaction plans must include the validation process to be taken following re-start of production following an emergency stoppage. Contingency Plans must be tested periodically for effectiveness, and reviewed and revised as necessary on at least an annual basis by a cross-functional team that includes Top Management.

Another important risk mitigation effort includes using a multi-disciplinary team to develop and improve facilities and equipment. A suitable environment can be a combination of human and physical factors, such as social, psychological, and physical. Plant layouts must optimize material flow, material handling, and the value-added use of building envelope. For all new and revised products and processes, Key Suppliers must use a multi-disciplinary team to determine manufacturing feasibility, and if processes are capable of consistently producing products/services that meet all Customer requirements. Key Suppliers should validate their ability to manufacture product to specifications at the required rate through production runs, benchmarking studies, or other means. Manufacturing feasibility assessments are to serve as inputs to Management Review.

2.5.1 PFMEA Risk Review and Reduction (BiQS: GM 1927 36 d Group)

Multi-disciplinary teams must use a systematic approach to proactively reduce risk. Monthly reviews are to focus on preventing defects from leaving the work station. Using a documented process for prioritizing top issues based on the Risk Limiting Method or equivalent, Key Suppliers must maintain action plans that include recommended actions, responsibilities and timing. Key Suppliers should conduct Reverse PFMEA events at the work stations and transfer knowledge back through the Process Flow, PFMEA and Control Plan.

2.5.2 By-Pass/Deviation Management (BiQS: GM 1927 36 a Group)

Key Suppliers must identify and maintain documentation of processes and process controls (including inspection devices and error-proofing systems) that may be by-passed or placed in deviation. The PFMEA for these processes/systems must include the use of primary and alternate control methods, and the internal approvals needed prior to implementation of the alternate control methods.

By-pass/deviation determinations must consider safety, failure mode severity, and the overall RPN rating for that process. Key Suppliers must implement Standardized Work Instructions that include NSI notification, and use of each alternate control method. When in place, Key Suppliers must verify the effectiveness of the alternate control methods on a daily basis at a minimum, with the goal being to return to the standard process as soon as possible. Examples of daily verification include quality-focused checks via the Layered Process Audit system, and daily Fast Response, Pre-Shift or similar leadership meetings.

Key Suppliers must implement traceability of all product produced while any alternate control methods are being used, for example verification and retention of First-Piece and Last-Piece from each shift.

Before shipping product that was inspected/tested using the alternate control method, Key Suppliers must obtain approval from NSI, if required. Key Suppliers must maintain and periodically review the documentation of alternate control methods.

Once the primary controls are re-instated, verification must be recorded for a defined period based on severity, and confirmation that all features of the primary control system have been effectively re-instated.

2.5.3 Error-Proofing/Detection Verification (BiQS: GM 1927 36 a Group)

Key Suppliers must maintain a list of error-proofing devices, and identify which can be by-passed and which cannot. These devices must be verified for function (that is, tested to failure or simulated failure) according to Standardized Work Instructions at the beginning of each shift at a minimum and documented in the Control Plan, and verification events must be recorded. Errorproof Verification Samples (when used) must be clearly identified and available at the work station, and if applicable, calibrated/verified for the intended purpose. The Standardized Work Instructions must include a reaction plan and employees must be knowledgeable about the reaction plan.

2.6 Managing Change

2.6.1 Process Change Control (BiQS: GM 1927 36 a Group)

Using a documented process for process change evaluation and control, Key Suppliers must evaluate all process changes after initial product approval, including those proposed by NSI, the Key Supplier, or its Sub-Tier Suppliers, for potential impact on form, fit, function, performance, and/or durability, and including the Design, Man, Machine, Material, Methods, and Environment components.

The process must include a requirement that the proposed changes be validated against Customer requirements (including the consideration of a production trial run (PTR) being conducted) and formally approved internally. In the case of changes proposed by the Key Supplier or its Sub-Tier Supplier, the Key Supplier must notify NSI, obtain recorded approval prior to implementation, and complete additional verification and identification requirements.

Key Suppliers must retain records detailing the employees authorizing the changes, the review of changes, and any necessary actions arising from the reviews.

Applicable documents, such as PFMEAs, Control Plans, and Standardized Work Instructions, must be updated as necessary, and relevant employees must be made aware of the revised requirements.

If the change relates to an FCA-related product, NSI will cascade all FCA quality requirements, including a Forever Requirements Notice to its Key Supplier(s), and the Key Supplier(s) will be required to do the same to affected Sub-Tier Supplier(s).

2.6.2 Inspection Gates (BiQS: GM 1927 36 c Group)

Key Suppliers must use inspection gates such as Job Set-Up Verifications, Start-Up Verifications, and Final Inspection to verify that product requirements have been met prior to shipping. The sampling frequency must be based on risk, and during high-risk periods (e.g., product launch, shut-down/start-up periods, product/process changes, Fast Response issues), the sampling frequency must be increased. Key Suppliers must retain records of product release that includes evidence of product conformance, and the identity of the person authorizing the release.

Job Set-ups must be verified when performed, such as during the initial run, a material change, or work cell changeover. Documented information must be available for set-up personnel, First-Piece/Last-Piece validations (as applicable) must be conducted, and the Last-Piece retained for comparison to First-Piece of next production run. Product and process compliance must also be verified after a planned or unplanned production shutdown period.

2.7 Sub-Tier Supplier Control

Key Suppliers must have a documented process to identify outsourced processes, and evaluate, select, monitor, and re-evaluate Sub-Tier Suppliers. The process must include the criteria and actions to be taken in order to escalate or reduce the type and extent of controls based on the Sub-Tier Supplier's performance, and assessment of risk to product conformity and the uninterrupted supply of product. Actions arising from these evaluations must be recorded.

The process must also ensure that the purchased products and services comply with the current applicable statutory and regulatory requirements of the country of shipment and receipt, and in the NSI-identified destination country, if provided.

When a Sub-Tier Supplier is responsible for Control Characteristics, it is the responsibility of the Key Supplier to adequately define and monitor the control system for these characteristics in their Control Plan. Quality requirements for a Sub-Tier Suppliers are the same as those for the Key Supplier; therefore Key

Suppliers must ensure that all such quality requirements are adequately communicated to the Sub-Tier Suppliers.

At a minimum, Sub-Tier Supplier monitoring must include product conformance to requirements, the number and extent of process disruptions, delivery schedule performance and the number of premium freight occurrences.

If NSI directs the Key Supplier to a Sub-Tier Supplier ("directed-buy"), all requirements of this section are applicable unless specific agreements are defined in the Key Supplier's contract with NSI.

2.8 Total Productive Maintenance

Key Suppliers must implement and maintain a documented total productive maintenance system. At a minimum, this system must include identification of key equipment, availability of replacement parts for key equipment, adequate resources to support the equipment, packaging and preservation of equipment, tooling and inspection devices, documented maintenance objectives, regular review of the maintenance plan and objectives and a documented action plan to address non-achievement of the objectives, use of preventive and predictive maintenance methods, and periodic overhaul of equipment. Preventive and predictive maintenance schedules and maintenance must be recorded and made available for review upon request.

Key Suppliers must maintain a system for production tooling management, whether owned by the Supplier or NSI, including maintenance and repair facilities and personnel, storage and recovery, set-up, tool change programs for perishable tools, and tool identification, including ownership. Any tooling not owned by the Key Supplier must be clearly and permanently marked so that ownership can be easily determined. When NSI provides tooling, it will be marked according to requirements upon receipt, unless otherwise formally arranged by NSI. If this is the case, marking requirements will be provided to the Key Supplier.

SECTION 3.0: MANUFACTURING PROCESS VALIDATION

Key Suppliers must demonstrate product conformance to all material, dimensional and processing requirements. This conformance must be established in accordance with the process capability requirements described below. Suppliers must provide a product certification in the format detailed in Appendix III or equivalent.

Process design and development validation must be performed in accordance with NSI requirements, and any applicable industry or regulatory standards. Validation timing must be planned in alignment with NSI-specified timing. When contractually agreed upon, validation must include the evaluation of the product within the final Customer's product.

3.1 Process Capability

Process capability must be demonstrated for the Control Characteristics identified in the Control Plan. Records must be maintained as evidence of the ability to achieve planned results.

3.1.1 Critical Characteristics are noted as "CC" or as otherwise defined by NSI's Customers. These Characteristics require a 2.0 Ppk at PPAP and 1.67 Cpk for continual process monitoring once process stability using control chart methodology has been achieved. Any Critical Characteristic not meeting capability requirements must be checked 100% on a device that is free from operator interpretation. Capability records for Critical Characteristics must be kept for minimum of 15 years.

3.1.2 Significant Characteristics are noted as "SC" or as otherwise defined by NSI's Customers. These characteristics require a 1.67 Ppk at PPAP and 1.33 Cpk for continual process monitoring once process stability using control chart methodology has been achieved.

3.1.3 An Action Plan is required if data does not meet the minimum requirements stated above. Key Suppliers must also notify NSI's Supplier Quality Engineer of any nonconformance to a Control Characteristic for material already shipped.

3.1.4 Once the Control Plan for Control Characteristics has been approved by NSI's Supplier Quality Engineer, the Key Supplier must not change the control of that Characteristic without written approval from NSI.

3.1.5 Key Suppliers of products containing Control Characteristics may be required to submit process capability data with each shipment upon request or per purchase order agreement.

3.2 Product/Service Approval Process

Key Suppliers must establish, implement and maintain documented product and manufacturing process approval process that conforms to NSI requirements. This includes approval of Sub-Tier Supplier products and services prior to part submission to NSI. When all requirements have been met, NSI provides formal approval prior to shipment, and this record must be maintained by the Key Supplier.

3.3 Production Part Approval Process (PPAP)

For automotive applications, Key Suppliers must make a PPAP submission prior to full production release whenever one of the following is planned:

- Initial submission
- Engineering Change(s)
- Tooling transfers, replacements, refurbishments
- Tooling inactive greater than 1 year
- Change to optional construction or material
- Correction of a discrepancy
- Sub-Tier Supplier change
- Change in part processing
- Parts produced at an additional location

- Other – please specifyas specified in the Purchase Order.

In each case, Key Supplier must submit samples, the appropriate Part Submission Warrant per the AIAG Production Part Approval Process (PPAP) reference manual, and an International Material Data System (IMDS) Submission (Note: NSI's IMDS Company ID is 16955). PPAP submissions records must be maintained for part production and service life plus one calendar year, unless specified by NSI or a regulatory agency.

3.3.1 Process Sign-Off (PSO)

A PSO run may be conducted at the Key Supplier's production facility if required by NSI's Customer. NSI will arrange this run with the Customer and Key Supplier.

SECTION 4.0: MANUFACTURING CONTROL

4.1 Quality Monitoring

NSI has a Zero Defects Policy. Key Suppliers are required to monitor their own shipments to assure an outgoing quality level of Zero Parts Defective.

4.2 Control of Nonconforming Product, and Material Identification and Traceability (BiQS: GM 1927 36 b Group)

Key Suppliers must have a standardized process for identifying all products in the facility, including inspection status. Nonconforming product must be segregated from conforming, and controls put in place to prevent further processing. Any unidentified or suspect product must be controlled as nonconforming product.

Key Suppliers must have a documented traceability plans for all automotive products based on the levels of risk for employees, Customers and end-users. These plans must ensure that nonconforming/suspect product can be identified and segregated. If required by NSI's Customer, Key Suppliers must identify the components with a unique serial number, the structure of which will be defined by NSI's Customer.

Records must be retained that detail the nonconformity, actions taken, concessions obtained (if applicable), and identification of the deciding authority.

Key Suppliers must have a documented disposition process for nonconforming product that is not to be reworked or repaired.

Employees must have a method to call for help when an abnormal condition on product or equipment occurs. Alarm limits for escalation of abnormal conditions must be in place, and must match the reaction plan detailed in the Control Plan.

Each container, rack, box, coil or pallet of product shipped to NSI must carry full identification, including Key Supplier and NSI part number(s), lot number(s), heat number(s), quantity, shipment date and deviation number, where applicable. Key Suppliers must use a barcode system that is compatible with the NSI barcode system. Identification must permit traceability back to manufacturing and inspection records. In addition, products must be shipped on a lot basis. The Key Supplier's definition for lot must be acceptable to NSI to the extentpossible.

In the event that nonconforming product has been shipped, the Key Supplier must notify NSI **immediately**. Sorting/rework must be performed on all work-in-process and finished goods by the Key Supplier or their agent.

Key Suppliers must perform analysis on any field failures, including parts returned from NSI, and must initiate problem-solving and corrective action to prevent recurrence. Results of the testing and investigation must be communicated to NSI, and within the organization.

4.3 Deviation for Nonconforming Products/Services

No shipments containing nonconforming product or services are accepted unless NSI has approved a formal deviation request from the Key Supplier prior to the shipment. Approved deviation requests come with an expiration date that must be honored. Products shipped under an approved deviation request must be identified as such. If the Key Supplier approves a deviation request from a Sub-Tier Supplier, these same requirements apply.

4.4 Rework/Repair Approval and Control

Key Suppliers who find it necessary to perform product rework or repair operations must first perform a risk analysis prior to the decision to rework/repair the product. If required by NSI, Key Suppliers must obtain formal approval prior to beginning the rework or repair. Key Suppliers must have appropriate rework/repair process documentation and quality inspection in place, and product must conform to the original requirements.

4.5 Corrective Action Requests

If product is received by NSI that fails to conform to NSI specifications, a Corrective Action Request (CAR) is issued to the Key Supplier. A written Corrective Action Response is required from the Key Supplier detailing the immediate steps taken to control the nonconforming product, the root cause of the nonconformance, intended/implemented permanent corrective action(s), responsibilities, and timing.

An immediate response is required within **twenty-four (24) hours** identifying the containment activity. Root Cause/Corrective Action plan is required by NSI within **ten (10) days**, or as directed by NSI's Customer. Verification of effectiveness and close closure is required by NSI within **thirty (30) days** following corrective action implementation.

All costs associated with shipping, handling, processing, reworking and inspecting nonconforming product will be charged to the Key Supplier.

4.5.1 Team Problem-Solving (BiQS: GM 1927 36 b Group) and Fast Response Processes (BiQS: GM 1927 36 c Group)

Key Suppliers must use a documented team problem-solving process for use at all levels of the organization, and problem-solving efforts must be initiated according to the specified criteria. This process must include initial containment, root cause analysis and the implementation of corrective actions (including those that may be necessary for similar products or processes), verification of corrective action effectiveness, review/revision as necessary of related documentation, and timely closure of the issue, including exit criteria. Records of this process must be retained.

A daily Fast Response Meeting is the means by which significant operational items, including team problem-solving efforts, are tracked via a display board or equivalent. These meetings are conducted by plant management, and staff-level employees participate.

4.5.2 Quality-Focused Checks (BiQS: GM 1927 36 c Group)

In order to verify the effectiveness of actions taken, Key Suppliers must add high-risk quality-focused items from Quality Alerts, internal findings, Corrective Actions Requests, and other Customer complaints to their Layered Audit system. In addition, the Layered Audit system is used to verify corrective actions implemented as the result of internal and external issues, and continual improvement. All quality-focused checks added to the Layered Audit system must be performed each shift for the Key Supplier's established period of time.

4.6 Material Handling, Packaging and Delivery

Key Suppliers must establish a system to prevent damage ors deterioration of product throughout their operations. Packaging must conform to all requirements.

Key Suppliers must maintain a documented process detailing packaging, marking, storage, inventory assessments, First-In/First-Out (FIFO), and shipping requirements. Obsolete product must be controlled in a manner similar to nonconforming product.

Delivery requirements must be clearly understood and communicated within the Key Supplier's organization to ensure that shipments of material will meet all requirements.

Key Suppliers who fail to meet 100% On- Time Delivery performance after appropriate planning information and purchase commitments have been provided may be issued a Corrective Action Request to improve delivery performance. Failure to improve delivery performance, or to submit a response to the Corrective Action Request could result in removal from the NSI Approved Key Supplier List.

The Material Manager reviews reviews Key Supplier freight bills to ensure unauthorized premium freight is not charged to NSI.

4.7 NSI Verification of Key Supplier Products/Services

NSI reserves the right to inspect all products/services received to verify conformance to its contractual requirements. When purchased product/services are to be verified at a Key Supplier's facility, the Materials Manager will make specific arrangements for inspection and a method of release, as agreed to by the Key Supplier and NSI. However, the ultimate acceptance of the product or service will be made by NSI in accordance with contractual requirements.

SECTION 5.0: ADDITIONAL SUPPLIER QUALITY SYSTEM REQUIREMENTS

5.1 Corporate Responsibility

Key Suppliers must develop, implement and maintain formal Policy(ies) to address a commitment to human rights, acceptable working conditions, business ethics, environmental protection, and anti-corruption. These principles must be incorporated into the Key Supplier's business relationship with NSI, and Key Supplier personnel must be made aware of these Policies on a periodically-scheduled basis. (See northernstamping.com, Suppliers page for the NSI Sustainability Policy and Code of Conduct.)

5.2 Responsibility and Authority for Customers, Facilities, and Processes

Key Suppliers must designate an NSI Customer Representative. This person is to be identified in the Key Supplier Survey file (Contact List tab) and serve as the main contact for all NSI interactions. In addition, Process Owners must be designated for all product realization and support processes. Employees responsible for product/service conformity must have the authority to stop production in order to correct issues, and employees with corrective action responsibilities must be informed immediately in order to prevent nonconforming product from being shipped.

Key Supplier facilities must be maintained in a state of order, cleanliness and repair that is consistent with product and process requirements. 5S or the equivalent should be in place and maintained.

Key Suppliers must have adequate support personnel and equipment, on-site and/or through service contracts and consultants across all shifts, to effectively supply conforming products/services on-time, and to support analytical problem-solving and continual improvement.

5.3 Competence, Awareness and Motivation

Key Suppliers must determine and provide the personnel necessary for an effective Quality Management System, including the operation and control of all processes within its scope.

Key Suppliers must maintain documented process(es) for identifying employee training needs, including awareness, and achieving competence for all personnel performing tasks that affect product and process conformity. Special attention must be paid to the satisfaction of Customer requirements.

On-the-job training must be provided as necessary to achieve competence for new, transferred, temporary or contract employees. Those employees whose work affects quality must be informed of the effect of nonconformances on Customer requirements. Where training is provided to achieve competence, the trainer's competency must be documented. Internal and external communications relevant to the Quality Management System must be conveyed consistently according to an established process.

Records must be maintained that demonstrate that all employees are aware of their impact on product quality, and the importance of their activities towards achieving, maintaining and improving product quality and Customer requirements, and the risks to the Customer if nonconforming products/services are shipped.

Key Suppliers must have a documented process to motivate employees to achieve Quality Objectives, make continual improvements, and foster an environment that promotes innovation. This process must promote quality and technical awareness throughout the entire organization.

There must be a documented process to verify that internal auditors are competent, and a documented list of qualified internal auditors. Internal auditors include those who audit the Quality Management System, processes, and/or products. At a minimum, they must have an understanding of the process approach for auditing, including risk-based thinking, Customer requirements, applicable ISO9001/IATF16949 requirements, AIAG Core Tools, and how to plan and conduct audits, and report and close out audit findings.

In addition, process auditors must understand the process they are auditing, including the process risk analysis (e.g., the PFMEA) and the Control Plan. Product auditors must understand product requirements and the use of inspection devices to verify product conformity.

Internal auditor competence must be maintained and continually improved by participating in at least the minimum number of audits per year (as defined by the Key Supplier), and maintaining knowledge of requirements based on internal and external changes.

5.4 Built-In Quality System (BiQS)

In order to comply with BiQS requirements, NSI must transfer some BiQS requirements through its Supply Chain. These Elements are incorporated and identified in this Manual. Refer to Appendix II for more information on BiQS.

5.5 Product Safety

For products and materials with product safety-related characteristics, Key Suppliers must have documented processes relating to the design and development of manufacturing processes to ensure that products comply with all requirements. These processes include identification of statutory and regulatory product safety requirements, special approvals in the Process FMEA and Control Plan, defined responsibilities (including the escalation process and information flow process), controls implemented for product safety-related characteristics, reaction plans, training for those involved in the manufacturing of product safety-related products, approval of product or process changes prior to implementation, transfer of requirements to Sub-Tier Suppliers (as applicable), product traceability by manufactured lot (at a minimum) throughout the Supply Chain, and use of lessons learned during the introduction of new product safety products.

5.6 Quality Policy, Objectives and Targets

Top Management must develop, maintain and implement a documented Quality Policy. This Policy is to be appropriate to the organization's purpose and strategic direction, and include commitments to satisfy applicable requirements and to continually improve the Quality Management System.

Based on the framework provided in the Quality Policy, Quality Objectives and Targets must be established, maintained and performance reported at relevant levels in order to support the Policy and the requirements of Customers and other interested parties. Objectives and Targets must be reviewed annually at a minimum and updated as necessary. The Policy, and Objectives and Targets must be understood throughout the organization.

5.7 Inspection Devices (BiQS: GM 1927 36 a Group)

Key Suppliers must maintain a system that ensures inspection devices are calibrated and capable for their intended use. The Key Supplier's applicable personnel must be able to demonstrate competence on device use.

Inspection devices must be referenced in Control Plans, and calibrated at assigned frequencies to the appropriate reference standards that are traceable to the National Institute of Standards and Technology (NIST) or equivalent international certification sources. Calibration results must be recorded, and the calibration status of these devices must be evident. If a device fails calibration, the Key Supplier must **immediately** develop a containment and verification plan to address in-house and shipped products. If it is determined that nonconforming product has been shipped to NSI, the Key Supplier must immediately notify NSI, and then follow up with a detailed summary of the event.

Key Suppliers who maintain an internal laboratory for such activities as product and process measurements, testing, and inspection device calibrations/verifications must have a documented lab scope

that includes capabilities. The lab must have adequate procedures, a competent staff, and maintain the required records. If required by NSI, layout inspection and functional testing must be detailed in Control Plans and performed at the required frequency, and results must be made available for review.

If external labs are used for inspection, test or calibration services, they must be accredited to ISO/IEC17025 or national equivalent, and have those services listed in their scope. If this is not the case, NSI must approve the use of the external lab.

Key Suppliers must have a documented process for managing calibration/verification records for such devices (regardless of ownership). Related records are to include:

- Records of calibration and maintenance activities
- Revisions to devices following engineering changes that impact measurement systems
- Out-of-tolerance readings as-received prior to calibration
- Assessments of risk for any out-of-tolerance condition, including notification to NSI if suspect product/material may have been shipped
- Statements of conformity to specifications
- As applicable, verification that the software version being used for product and process control is correct.

For all inspection devices identified in Control Plans, statistical studies (e.g., Gauge Reproducibility & Repeatability (R&R) studies) must be conducted to analyze the variation present. Analytical methods and acceptance criteria must conform to that presented in the AIAG's Measurement System Analysis (MSA) reference manual, or equivalent if approved by NSI. Results must be studied, and action taken if the results are unsatisfactory.

5.8 Continual Improvement

The Key Supplier's management has the primary responsibility for continualous improvement, and must provide leadership in the improvement process. Key Suppliers are expected to continually strive for improvements in their Quality Management System and the reduction of process variations.

They must have a documented process for continual improvement that includes objectives, measurement methodology, determination of effectiveness, a manufacturing process improvement plan with emphasis on the reduction of process variation and waste, and risk analyses. Improvement efforts must determine and implement opportunities to meet Customer requirements and enhance Customer satisfaction.

5.9 System Documents and Records

5.9.1 Quality Manual

Key Suppliers must maintain a Quality Manual that, at a minimum, includes the scope of the Quality Management System, documented processes established for the System (or reference to them), a description of processes (including outsourced processes) and their interactions (inputs and outputs), and a matrix indicating where within the System their Customer-specific requirements are addressed.

5.9.2 Document Control

Key Suppliers must have a documented system that provides for the issue and control of all new or revised documents, availability where needed, the recall, replacement, and retention of those that are obsolete, and a system to evaluate compliance.

Key Suppliers must have a documented process that details the review, distribution, and implementation of Customer-supplied drawings, process and material specifications, and applicable engineering standards/specifications and related revisions. Reviews must be completed within ten (10) working days for receipt of new or revised standards/specifications.

5.9.3 Standardized Work Instructions (BiQS: GM 1927 36 b Group)

Key Suppliers must document and implement all operational work using a standardized format that includes safety, quality and element time requirements, and includes the answers to what, how and why. These documents must be available for use at the applicable work stations, and personnel responsible for performing the work must understand the requirements. Any visual standards used throughout the organization must also be standardized, controlled, clearly communicated to applicable personnel, and referenced in Standardized Work documents. Key Suppliers must implement some form of workplace organization, such as 5S, to support Standardized Work requirements.

5.9.4 Record Control

A documented record retention policy must be maintained. Record control must satisfy statutory, regulatory, Customer, and organizational requirements, including those detailed in GMW15920 for GM-related records. Production part approvals, tooling maintenance and ownership records, process design records, and Customer purchase orders/contracts and amendments must be retained for part production and service life, plus one (1) calendar year, unless specified by Customers or a regulatory agency.

For FCA-related products and services, Key Suppliers must retain quality performance records (e.g., control charts, inspection records, test records) for a minimum of one (1) calendar year after the year in which they were created. Records of internal QMS audits and Management Reviews must be retained for a minimum of three (3) years.

5.10 Incoming Product Control

Key Suppliers must ensure that all incoming materials conform to the requirements specified in applicable specifications/documents. Incoming material may be withheld from use pending verification by one or a combination of the following methods:

5.10.1 Receiving Inspection: The incoming material must be controlled through inspection and statistical analysis of results. Records are maintained to provide evidence of conformance to specifications.

5.10.2 Sub-Tier Supplier Control: Records must exist that verify the control of incoming material through the Sub-Tier Supplier control systems.

5.10.3 Verification by Production Process: The control of incoming product quality can be measured through the manufacturing process. Material or Specific Characteristics can be qualified during manufacturing when the process assures that production/ assembly could not take place if the incoming material failed to conform to the specified requirements.

All documented information that substantiates the Key Supplier's option of verification method must be available for NSI review upon request.

5.11 Management Review

Top Management must review the Quality Management System at planned intervals to ensure its continuing suitability, effectiveness and alignment with the organization's strategic direction. Inputs include a review of internal and external issues, product realization and support process performance, Customer feedback, Quality Policy, Objectives and Targets, process, product and internal Quality Management System audit performance, and Sub-Tier Supplier performance. An action plan must be developed and implemented whenever Customer performance targets aren't met.

Outputs include identification of opportunities for improvement, the need for Quality Management System changes, and resource needs. Records of Management Reviews must be maintained.

5.12 Process Effectiveness and Efficiency

The Key Supplier's Top Management must review product realization and support processes to ensure that they are achieving their intended outputs, and improve their effectiveness and efficiency. This review must include the review of Customer-reported performance. These activities are to serve as inputs for Management Review.

Key Suppliers must monitor internal and external performance indicators to ensure compliance to all requirements. These indicators may include delivered product quality performance, Customer disruptions, delivery schedule performance, including incidents of premium freight, and incidents of Customer notifications related to quality or delivery issues.

Key Suppliers must use a production scheduling process such as Just-In-Time to ensure that Customer order requirements are met.

5.13 Internal Audits

Key Suppliers must have a documented internal audit process that includes audits of the entire Quality Management System, process audits, and product audits. The audit frequency and sample size must be prioritized based on risk, performance trends, and the criticality of processes. Frequency must be reviewed and revised as appropriate based on the occurrence of process changes, and internal and external nonconformities. Internal auditors must be competent, and be selected based on objectivity relative to the subject of the audit. Results of audits must be reported to relevant management, and corrective actions must be implemented without undue delay. The effectiveness of the internal audit program must be a Management Review agenda item.

5.13.1 Quality Management System

Using an annual schedule, the Quality Management System must be audited for efficiency and effectiveness using a process approach, and including a sampling of Customer-specific Quality Management System requirements.

5.13.2 Layered Process Audits (BiQS: GM 1927 36 a Group)

Key Suppliers are required to have a standardized Layered Process Audit system that includes an Audit Schedule, and that verifies conformance for all product-related processes on all applicable shifts, including shift hand-overs as applicable, and the effectiveness of PFMEA, Control Plan and related documentation implementation. All levels of the Management staff are required to participate in the audit system, and quality-focused checks are also verified. Customer complaints/rejections must trigger an audit on the process that caused the issue. Those issues that can't be corrected during the audit must be moved to an Action Plan for monitoring to closure. Records are to be maintained. Questions are to be reviewed periodically and revised as necessary to address organization weaknesses. Layered audits are also to be used during the verification of corrective action effectiveness.

5.13.3 Product Audits

Key Suppliers must audit products at appropriate stages of production and delivery in order to verify conformance to specified requirements.

Key Suppliers must perform quality-focused checks on each shift.

Key Suppliers must have a process for final inspection, which must be done on all finished product prior to shipping. This inspection can be at 100% frequency, or less based on the risk assessment. Quality-focused checks must be included in Standardized Work Instructions. Successive checks must be increased during high-risk scenarios, such as product launch, major process changes, production shut-down, or Customer feedback.

Key Suppliers must maintain inspection systems and/or tests that ensure conformance with all requirements. In-process controls and associated documents must be readily available for review by an NSI representative. For products designated by NSI as "appearance items", Key Supplier must provide appropriate resources (including lighting) for evaluation, controlled Appearance Masters as appropriate, and verification of competency for employees making appearance evaluations.

Audits of ready-to-ship product should be conducted on a regular basis with appropriate documentation. Records are to be made available upon request.

5.14 AIAG CQI Special Process Self-Assessments

NSI requires Key Suppliers of Special Processes (e.g., Coating, Plating, Heat Treating, Welding, Soldering and Molding) to perform annual AIAG CQI self-assessment audits. Completed audits are to be forwarded to the NSI Supplier Quality Engineer on an annual basis (close to 365 days from the prior assessment). Any findings of "Not Satisfactory", "Needs Immediate Attention", "Failed", and Process Table items "Not Meeting Minimum Requirements" must be closed within 90 days, and then re-submitted to NSI. This requirement extends to Key Suppliers with Special Processes performed by their Sub-Tier Suppliers on product supplied to NSI.

Appendix I: Product Life Cycle Management

Product Life Cycle Management considers five main elements that are achieved in four phases:

1. Engineering: Meeting all internal and external requirements, and coordinating the design process by involving all relevant stakeholders. Reliability Engineering is an important component.
2. Project Planning: Managing the allocation of resources, tracking progress, and planning for new product development. Portfolio Management assists management in the tracking of new products and services, and making trade-off decisions when resources are scarce.
3. Product Design: Creating a new product/service.
4. Manufacturing Process Planning: Defining how products are to be manufactured or services delivered.
5. Product Data Management: Capturing and maintaining information on products and/or services through their entire life. Change Management is an important component.

Phase 1: Introduction (Product Definition)

The first step is the definition of the product requirements based on customer, market, organization, market and regulatory bodies' requirements. These requirements lead to the definition of the product requirements, and the main technical parameters and functional aspects. The main activities are:

- Generation and filtering of ideas
- Product definition
- Project plan
- Final review.

The filtering process considers whether the idea is consistent with the organization's strategic focus, whether the market size and growth potential are appealing, and the manufacturing feasibility.

Product definition determines which product characteristics are necessary to meet customer needs and business objectives. It transforms feasible ideas into economically-competitive product concepts, and then produces the initial design concept.

The project plan details time and resource allocation, and the scheduling of tasks. A final review is conducted to determine if the organization should commit resources to the product design and development stage.

Phase 2: Growth (Product Design and Development)

If the decision is to proceed with product design and development, this phase starts with the detailed product design, and then advances to through an iterative prototype testing and design refinement process. It eventually ends with a full product launch, and can also involve redesign and improvement of existing products.

Reliability Engineering in the design and development stage includes reliability assessments, development testing, and reliability improvement. Test data is gathered from experiments, and statistical techniques are used to estimate reliability. Development tests, such as testing to failure, design limit testing, and accelerated life testing, are then conducted to further evaluate and improve product reliability. Reliability improvement can be attained through efforts such as redundancy design, stress-strength analysis, reliability growth, and preventive maintenance design.

Phase 3: Maturity (Manufacturing Process Design and Implementation)

Once the product design is complete, the manufacturing process must be defined and implemented. A well-designed manufacturing process achieves a low production cost and the desired productivity and quality levels. The main activities involved in manufacturing process design are:

- Supply chain design
- Process planning
- Process layout
- Equipment selection.

Supply chain design involves a variety of decisions, including supplier selection, transportation method, and inventory management policies. Supplier selection includes considerations such as quality, price, and lead time.

Process planning determines how the product will be manufactured. Key elements to consider are:

- Set-up planning: arranging manufacturing features in a sequence of setups that ensures quality and productivity
- Tolerance analysis: the design and allocation of manufacturing tolerance
- Process capability indicators: used to predict a proposed production system's performance.
- Key drivers of quality: approaches include Quality Function Deployment (QFD), Design of Experiments (DOE), and Failure Mode and Effects Analysis (FMEA).

Process layout impacts manufacturing flexibility, complexity, and robustness. Manufacturing flexibility is the ability to build several different products in one system with no production delays due to product differences. Manufacturing complexity is characterized by the number of components and products, the types of processes, and schedule stability. In general, complexity negatively impacts manufacturing performance indicators, including quality. Robustness refers to the ability to minimize or eliminate process fluctuations and drift.

Equipment selection determines key operating characteristics and reliability, and therefore impacts quality. The goal is to achieve a good balance between productivity and quality.

Phase 4: Decline (Post-Manufacturing)

The final phase of the life cycle involves managing information and services. This can include providing customers and support staff with the information required for maintenance and repair, as well as waste management.

The decline phase can be divided into three stages:

- Marketing
- Post-sale support
- Retirement.

Marketing includes internal and external considerations, such as logistics, price, promotion, and warranty, competitors, economy, and customer feedback.

Post-sale support is necessary to ensure satisfactory operation of the product, and can add value to the product from both manufacturer's perspective (e.g., sales) and customer's perspective (e.g., postponing product replacement). Support activities including providing spares parts, information, and training, installation and maintenance service contracts, and warranties. Product Data Management and Change Management play crucial roles in the post-sale support stage.

There is an end-of-life to every product. Whether it is disposal or destruction of product, life cycle management should be carefully considered, as it may be legislated or required and therefore not free from consequences.

Appendix II: Built-In Quality System

The most efficient and effective way to guarantee high-quality performance is through the use of a concept called Built-In-Quality (BIQ). BIQ is one of the five principles of Lean Manufacturing. The other four principles are:

- Employee Engagement
- Standardization
- Short Lead Time
- Continual Improvement

When combined with the other four principles of Lean Manufacturing, BiQ defines the steps required for building quality into the manufacturing process. BIQ allows an organization to move from the detection and containment of defects to preventing defects from ever being produced. By migrating through each step of the BIQ process, an organization is able to increase its ability to build quality in station and lower the overall cost of quality by reducing the need for inspection and correction.

Many Tier 1 Automotive Suppliers are required to attain second-party certification to BiQS, which is a formal thirty Element protocol. BiQS certification includes a requirement for the implementation of the many BiQS requirements at Sub-Tier Suppliers.

Appendix III: Product Certification

Key Suppliers who provide steel must provide the results of measurements and tests that determine the chemical, mechanical, and hardness properties specified in applicable material specifications. Results must be recorded to certify specification conformance on a lot-by-lot basis, and must accompany each shipment's shipping documents.

Revision History

Release Date	*Change Description*
07.15.11	Official release
02.20.15	Revised Supplier Performance Monitoring/Reporting to new rating system, including periodic report card emails
02.03.18	Added IATF16949:2016 and BiQS requirements, updated Key Supplier Performance Rating System description.
05.24.18	Page 5: Revised the Key Supplier Performance Reporting System to include disruptions of, and special status notifications from NSI's Customers (i.e., yard holds, stop ships, field actions, New-Business-Hold, Controlled Shipping), and instances of premium freight, recalls, warranty claims and dealer returns.
02.05.19	Revised BiQS Element references to match new references in 12.03.18 revision of BiQS.