Great Lakes Rubber Company

Supplier Quality Assurance Manual

Revision D

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1. Introduction

Having excellent suppliers is a prerequisite to our mutual success and to the success of our customers. Great Lakes Rubber takes pride in taking care of their customers and we rely heavily on your support.

This Supplier Quality Assurance Manual (SQAM) outlines the quality requirements for GLR suppliers.

It is intended to supplement ISO/IATF 16949 requirements by outlining GLR's expectations and requirements. GLR expects its' supply base to develop quality systems based on the latest edition of the ISO 9001 and IATF 16949 standards.

The latest editions of reference manuals should be followed and can be purchased at www.aiag.org.

- *Advanced Product Quality Planning (APQP)*
- *Production Part Approval Process (PPAP)*
- *Measurement System Analysis (MSA)*
- *Potential Failure Mode & Effects Analysis (FMEA)*
- *Fundamental Statistical Process Control (SPC)*

Suppliers may also be required to comply with OEM, or GLR's customer specific requirements.

2. Great Lakes Rubber Overview

Great Lakes Rubber Company is an ISO / TS 16949 manufacturer of precision, custom molded rubber products and prototypes. We specialize in producing very close tolerance parts, rubber to metal bonding, form grinding and custom compound development.

We have a variety of specialty compounds developed for use in long life dynamic applications. These compounds are designed for:

- Low or constant coefficient of friction
- Environmental resistance
- Wide temperature range performance
- Dimensional stability

We serve the following markets

- Industrial
- Automotive / Transportation
- Military
- Medical
- Food processing (FDA)

We are located at

30573 Beck Rd
Wixom, MI 48393
www.greatlakesrubberco.com

Please direct all questions regarding quality issues or concerns to GLR Quality Quality@greatlakesrubberco.com

If further assistance is needed, please contact

GLR buyer orders@greatlakesrubberco.com or
GLR Sales Coordinator sales@greatlakesrubberco.com

3. Supplier Approval Process

GLR evaluates and approves new suppliers based on their ability to meet our requirements. The selection process is initiated by Sales and Engineering.

An Approved Supplier List is maintained and updated regularly. GLR will purchase production & service components and raw materials from only those suppliers on the approved list.

Approved Supplier Criteria
Criterion for addition to the Approved Supplier List includes, but is not limited to:

- Quality registration (e.g. IATF 16949, ISO 9001, ISO/IEC 17025)
- Quality/ performance history
- Cost
- Delivery
- Financial stability
- Customer directed

Note: Substandard performance in any of the above areas can result in the supplier being removed from the ASL.

4. Product Requirements

Purchased product requirements are communicated in the RFQ and finalized in the purchase agreement

Purchased services requirements for production parts are communicated at time of RFQ and finalized in a Requirements Document. The Requirements Document includes:

- Contact information
- Length of agreement
- Scope of work
- Reporting
- Inventory control
- Traceability
- In process controls
- Lead times
- Control of customer owned material
- Packaging and labeling
- Shipping logistics
- Release and validation requirements
- Supplier responsibilities

5. Quality Management System (QMS)

Management Responsibility
The supplier's management with executive responsibility shall define and document its' policy for quality. This policy shall be understood, implemented and maintained at all levels of the organization.

Responsibilities for personnel, who manage perform and verify work affecting quality shall be defined and documented. A management review of the quality system shall take place at regular intervals to insure its effectiveness.

Additionally, a process for determining customer satisfaction shall be documented and supported by objective evidence

Quality Documentation/ Procedures
The supplier shall establish and maintain documented procedures that ensure that product or services conform to GLR specific requirements. A quality manual shall be prepared and used to outline the structure of the supplier's quality system. Controlled documents may include Process Control Plan, PFMEA and Process Flow developed in accordance with the AIAG guidelines. Any specified key characteristics identified by GLR or the supplier must be included.

The supplier must ensure that they will be using only pertinent documents provided by GLR. Any ambiguities, missing documents or specifications must be clarified and or requested without delay prior to first article or PPAP submission.

Advanced Product Quality Planning - (Product Launch)
Suppliers are required to conduct evaluations of processes and products in advance of initial production. Advanced Product Quality Planning (APQP) is intended to identify and correct any potential problems, permit the early selection of appropriate and best processing methods, and involves a participative, cross-functional team (including GLR) approach in launching products.

It is recommended that suppliers use the AIAG APQP manuals, or agreed upon format, to insure that coordination of product launches go as planned.

Production Part Approval Process (PPAP)
Suppliers may be required to submit PPAP's for new or changed products.

The requirement for and level of PPAP will be requested at time of RFQ and managed by GLR's Quality Engineer.

When required PPAPs need to meet the latest AIAG *Production Part Approval Process (PPAP)* publication and GLR customers' PPAP requirements.

PPAP samples or quantities shall be delivered to the appropriate QE. Suppliers may be required to fulfill OEM requirements for CQI and IATF per www.iatfglobaloversight.org.

All submitted PPAPs must have the GLR QE approval on the Part Submission Warrant (PSW) prior to the shipment of any production parts or services. Deviations or interim approvals will be granted on an as-needed basis.

- ***Interim Approval of PPAP***

Interim Approval permits the shipment of material for production requirements on a limited time or piece quantity basis. Interim Approval will only be granted with a defined expiration date and when the supplier has:

1. Clearly defined the root cause of the nonconformance(s) preventing production approval; and
2. Prepared an interim approval action plan, agreed upon by the GLR customer facility. Re-submission to obtain full PPAP approval is required.

Control of GLR-Supplied Product
The supplier shall establish and maintain a system for the control, storage and maintenance of GLR supplied product provided for use into their manufacturing work flow. Product that is lost or unsuitable for use should be reported to the GLR buyer.

GLR supplied (owned) product includes, but is not limited to:

1. Tooling, molds or fixtures
2. Returnable packaging material, containers or bins
3. Consigned material

Direct any questions concerning the determination of GLR supplied product to the GLR buyer

Transfer/Out Source of Tooling
Transfers of tools, molds, or other GLR equipment to any other location or outside source shall follow the GLR Outsourcing procedure and be closely monitored by both parties to insure a smooth transition which meets the requirements of GLR and the GLR customer impacted by the transfer.

Product Identification & Traceability
The supplier shall establish and maintain documented procedures for identifying the product by suitable means from receipt of the product and during all stages of production, delivery and installation. This includes any product that may have an expiration date or shelf life.

Process Control
The supplier shall establish controlled conditions and documented procedures for their production processes, which directly affect product quality. The supplier shall maintain documented process monitoring and operator instructions for all employees that have responsibility for operation processes. Job set-ups shall be verified whenever a set-up is performed.

GLR should be notified for guidance on approval requirements for any changes to the manufacturing process, prior to the change being implemented. Note: Some GLR customers require approval for process changes. These requirements must be met.

Preventive Maintenance
A preventive maintenance program shall be established which includes, as a minimum:

1. A procedure that describes planned maintenance activities
2. Scheduled maintenance activities
3. Predictive maintenance methods
4. Availability of replacement parts for key manufacturing equipment

The supplier's facility shall maintain a state of order and cleanliness appropriate to the products manufactured for GLR.

Inspection and Testing

➢ *In-process Inspection*

Sufficient control shall be maintained over manufacturing processes to prevent excessive product variability and to assure conformance of the characteristics of product which can be verified only at the time and point of manufacture:

- Characteristics defined by GLR as critical or safety-related shall be closely monitored. Rubber compounds should be statistically monitored for at least the following
    - Ml
    - Mh
    - Ts1 or Ts2
    - T90
- Operating instructions shall be accessible at each station.
- Routing sheets or shop travelers may be used to control the material flow throughout the manufacturing process.
- Visual inspection aids should be available to plant personnel and repetitive non-conformances shall be highlighted on the visual aids.

Suppliers shall comply with inspection requirements provided in the GLR quote package. If needed, contact GLR QE to attain clarification of inspection requirements.

Product Design/Production Validation

When required suppliers shall use ISO 17025, A2LA or certified commercial labs to validate GLR or OEM defined specifications. The requirement for certification will be communicated during the initial quoting process.

Auditing & Verification

GLR may ask potential suppliers to self-conduct a Supplier Assessment to monitor key criteria. Depending on the initial score, GLR may implement Action Items up to and including an onsite follow-up assessment by a GLR associate.

GLR reserves the right to conduct periodic surveillance audits to ensure QMS maintenance.

For recurring issues, the supplier will grant GLR access to their production facility based on a previously agreed date. The visit will be of adequate extent and the supplier will provide GLR an appropriately qualified associate for support. The supplier is responsible for correcting any agreed weaknesses, and submitting an action plan for those weaknesses discovered during the GLR visit.

Additionally, if deemed necessary the supplier shall allow GLR access to its sub-suppliers and the right to audit any sub-supplier.

Measurement and Calibration Testing

A calibration system shall be used for all inspection instruments and testing equipment. All measuring devices or equipment should bear an indicator which verifies the current status and shows the date on which the next inspection or recalibration is required. Certified standards and methods (traceable to national standards) shall be used when validating or recalibrating measurement devices.

Records of calibrations must be maintained as noted in applicable IATF or ISO standards.

Measurement System Analysis (MSA) when required shall be in accordance with the latest AIAG MSA guidelines by performing gage repeatability and reproducibility (GR&R) studies that show evidence that the correct type of device is in use.

Control of Nonconforming Product

The supplier shall establish and maintain a system to ensure that nonconforming and suspect product is prevented from unintended use or processing. This system must provide for identification, documentation, evaluation, segregation and disposition of nonconforming product.

The supplier shall provide visual identification for any nonconforming or suspect material/product and any quarantine areas.

In-process nonconforming product must be appropriately tagged, segregated from good product and be removed from the production area to a designated location for rework or material review.

Review and Disposition of Nonconforming Product

The responsibility for review and authority for the disposition of nonconforming product shall be defined. Nonconforming product shall be reviewed in accordance to procedures and it may be:

1. Reworked – to meet specified requirements with GLR / customer approval
2. Accepted – with or without repair
3. Rejected – as is
4. Rejected – render unusable
5. Designated for an alternate application

GLR Consigned Material Disposition

Suppliers processing GLR consigned material must provide quality data defining the defects to their GLR contact. Supplier must obtain the appropriate Returned Material Authorization (RMA) from the GLR QE. Suppliers must return all material on the next available truck following receipt of the approved RMA; this timeframe should not extend longer than one week.

All GLR non-conforming consigned material that cannot be reworked must be returned to GLR unless directed otherwise in writing.

Sorting or Rework of Nonconforming or Suspect Product

When the supplier product must be sorted or reworked, the preferred method is by returning product to the supplier for sort/rework at the supplier's location. Sort/rework done on GLR premises requires plant quality department approval. Regardless of the arrangement, the GLR QE needs to be involved. Written instructions for rework or repair are required. The reworked parts or assemblies must be identified and re-inspected by a GLR quality representative to assure conformance to standards.

GLR will initiate a sorting/reworking charge, when sorting by GLR personnel is required to maintain production. These charges will be documented.

Authorization of Temporary Change of Material or Process

The supplier shall not make any changes to material, packaging, processing, or other aspect that may affect product quality, or deviate from original approved specifications without explicit written authorization from the GLR QE, Chemist or Sales Coordinator.

GLR owned rubber compounds require GLR approval for any material substitution. Vendor owned rubber compounds may use vendor approved equivalents without notification. At all times rubber compounds must meet print specifications

Refer to the latest version of the AIAG standard D-22 and PPAP Manual for changes requiring notification to GLR. Check with the GLR QE for first article or PPAP requirements.

Corrective and Preventive Action

➢ Corrective Action

When notified of a nonconformance by a GLR quality representative through the following minimum corrective actions need to be taken:

- **Immediately- Containment of the problem:**
  - In-House product
  - Work-in-process
  - Product in transit
  - Product at subcontractor's facility
- **Within 24 hours- Provide disposition**
  - Of nonconforming and/or suspect product
  - Response of interim corrective action
- **Within 10 working days- Documented permanent corrective action plan**

Suppliers may document corrective actions using their own format but must provide at a minimum the following information:

1. Description of problem
2. Identification of root cause
3. Interim corrective actions (with dates of implementation)
4. Permanent corrective actions (with dates of implementation)
5. Verification of permanent corrective actions (with date verified)
6. Prevention methods

Returned products shall be analyzed to determine the root cause of the problem and how to prevent it from recurring. Use of statistical tools such as Pareto Analysis, Cause and Effect Diagrams and Control Charts should be employed, as appropriate.

As required, the supplier will send the necessary representatives to the GLR and/or GLR customer location to provide support in solving issues resulting from the nonconformance.

Additionally when chronic, recurring and/or customer-related issues occur GLR reserves the right to place suppliers on 3rd party containment at the suppliers cost.

- **Preventive Action**

Appropriate sources of information from processes and work operations which affect product quality, audit results, quality records, service reports and customer complaints will be used to detect and eliminate potential causes of nonconformance.

Procedures on preventive action, as a minimum, will include:

1. Determination of actions needed to solve any problems requiring preventive action
2. Implementation of preventive action and verification of its effectiveness
3. Suppliers are encouraged to implement mistake-proofing strategies such as creating fixtures, automation, color-coding, etc.

Packaging, Handling and Labeling

- ***Packaging & Handling***

If specific packaging requirements are needed it will be communicated during the initial quoting process. If required, all suppliers are to submit packaging information, with their quote, to the GLR buyer.

Even if not specified all packaging must provide the appropriate amount of protection against damage, contamination and any other defect that will cause a rejection at GLR or our external customers. It is the supplier's responsibility to ensure that packaging has been designed and constructed to fulfill this requirement.

NOTE: If packaging has been designated by GLR, it is the supplier's responsibility to sign off on all packaging designs as fit for use and ensure that the appropriate packaging material is used with the designated product. Any deviation from using the intended packaging or container should be approved (in writing) by GLR QE. If packaging (designed by GLR) is insufficient for use, it is the supplier's responsibility to notify the GLR QE in writing.

All packaging changes must be submitted to and approved by GLR QE. A brief explanation of the need for the change along with any other pertinent information should accompany the request.

The supplier shall provide methods of handling product that prevent damage or deterioration.

➢ ***Labeling***

All material identification labels or tags must remain intact from the original point of manufacture through GLR's receipt and at the affected receiving location. All labels must at a minimum include

- GLR part/compound number
- quantity
- lot number
- date

For returnable containers, old labels must be removed or covered to insure that product identification is maintained.

If required bar code labels should adhere to the following AIAG format

A	GLR part / compound number	24 pt bold
B	Part description (not required for compounds)	12 pt bold
C	Quantity per container	24 pt bold
D	Supplier code (GLR will provide)	20 pt bold
E	Serial number (supplier generated)	20 pt bold
F	PO number	20 pt bold
G	Lot number	20 pt bold
H	Date (date produced or shipped)	20 pt bold

Data identifiers are used to define a general category on the barcode label.

The barcoded field shall start with the data identifier and will identify the type of information encoded in that symbol.

The data identifier may be printed in the human readable characters

For the following categories use the following data identifier prefix

- D Date
- K PO number
- P GLR part / compound number
- Q Quantity
- S Serial number
- T Lot number
- V Supplier code

Example: Q100 Use for a quantity of 100

Training and Statistical Methods

The supplier shall establish and maintain documented procedures which identify and provide for the training of all personnel performing activities affecting quality.

As appropriate, suppliers shall determine the need for statistical methods required for controlling and verifying process capability and product characteristics. Basic statistical tools should be used when applicable to maintain process consistency.

Statutory and Regulatory Requirements

All product and services shall comply with current applicable statutory and regulatory requirements for the country of origin, country of receipt and any customer identified country of use.

6. Supplier Performance

GLR monitors supplier performance, to

- determine those suppliers who need assistance
- recognize outstanding supplier performance, and
- promote continual improvement throughout the supply base

Suppliers are evaluated by the following metrics:

Metric	**Weight**
Delivery conformance	33%
Part quality	
PPM	33%
# discrepant occurrences	33%

7.0 Change History

Rev D	24Jul19	Initial external release