



# METALBUILT

## Supplier Quality Manual

### INTRODUCTION

#### Welcome to Metalbuilt LLC

**Metalbuilt is a leading prototype and low volume production manufacture of assemblies and stampings to the automotive, defense, aerospace and appliance industries.**

#### Introduction to Manual

In today's manufacturing environment, product that is found to be non-conforming at receiving, or during production, causes serious disruptions of the production and shipping schedules, resulting in high production costs. Even the best Receiving Inspection program cannot detect all defective material. Metalbuilt LLC requires suppliers to control the quality of material shipped to Metalbuilt LLC, so that Metalbuilt LLC does not need to inspect the product when it is received.

This manual describes Metalbuilt LLC's expectations for its suppliers in order to ensure that purchased material meets Metalbuilt LLC's requirements.

#### Scope

This information applies to all suppliers who have interest in doing business with Metalbuilt LLC. It also applies to Metalbuilt LLC's outsourced partners or subsidiaries.

#### Metalbuilt LLC Quality Policy

##### QUALITY POLICY

**To meet our customers' and other interested parties' requirements, providing them with a product that meets or exceeds their expectations, and is delivered on-time and in an efficient manner. We strive to continually improve our conformance to this policy.**

##### QUALITY OBJECTIVES

- 100% on time delivery
- 0% defects
- Zero injuries

## Table of Contents

<b>INTRODUCTION.....</b>	<b>1</b>
Welcome to Metalbuilt LLC.....	1
Introduction to Manual.....	1
Scope.....	1
Metalbuilt LLC Quality Policy.....	1
Table of Contents.....	2
<b>1.0 QUALITY MANAGEMENT SYSTEM REQUIREMENTS.....</b>	<b>3</b>
1.1 Quality Management System.....	3
1.2 Quality Manual and Procedures.....	3
1.3 Control of Sub-tier Suppliers.....	3
<b>2.0 SUPPLIER QUALIFICATION PROCESS.....</b>	<b>4</b>
2.1 New Supplier Questionnaire/Self-Assessment.....	4
2.2 New Supplier Quality Documents (If applicable).....	4
2.3 On-Site Assessment.....	4
2.4 Periodic Reevaluation.....	4
<b>3.0 PART QUALIFICATION.....</b>	<b>5</b>
3.1 First Article Requirements.....	5
3.2 Dimensional Inspection Report.....	5
3.3 Material Certification/Test Report.....	5
3.4 Gage Repeatability & Reproducibility (R&R) Studies.....	5
3.5 Gage Correlation Studies.....	5
3.6 Process Capability Studies.....	6
3.7 Failure Modes and Effects Analysis (FMEA).....	6
3.8 Control Plan.....	6
3.9 Electrostatic Discharge (ESD) Susceptibility.....	7
3.10 Material Safety Data Sheets (MSDS).....	7
3.11 Agency Approvals and Compatibility Reports.....	7
3.12 Packaging & Labeling.....	7
3.13 Traceability.....	7
<b>4.0 MANUFACTURING CONTROL.....</b>	<b>8</b>
4.1 Process Control.....	8
4.2 Statistical Process Control.....	8
4.3 Process Performance Requirements.....	8
4.4 Process Improvement.....	8
4.5 Lot Control.....	8
4.6 Traceability.....	9
4.7 Workmanship.....	9
4.8 Safety.....	9
4.9 Maintenance.....	9
4.10 Electrostatic Discharge (ESD) Controls.....	9
<b>5.0 DRAWINGS/CHANGES.....</b>	<b>10</b>
5.1 Drawing and Change Control.....	10
5.2 Process Changes, Engineering Changes.....	10
5.3 Supplier Process Change Request (SPCR).....	10
5.4 Supplier Deviation Request.....	10
<b>6.0 PACKAGING &amp; LABELING.....</b>	<b>12</b>
6.1 Packaging.....	12
6.2 Labeling.....	12
<b>7.0 CORRECTIVE ACTION SYSTEM.....</b>	<b>13</b>
7.1 Corrective Action Process Approach.....	13
7.2 Supplier Corrective Action.....	13
<b>8.0 SHIP-TO-USE (STU).....</b>	<b>14</b>
8.1 Ship-to-Use Requirements.....	14
8.2 Ship-to-Use Suspension.....	14
<b>9.0 SUPPLIER MONITORING.....</b>	<b>15</b>
9.1 Supplier Audits.....	15
9.2 Inspection Audits.....	15
9.3 N <sup>th</sup> Article Inspection.....	15
9.4 Supplier-Furnished Lot Documentation.....	15
<b>Appendix 1.....</b>	<b>16</b>

## **1.0 Quality Management System Requirements**

### **1.1 Quality Management System**

Each Metalbuilt LLC supplier is required to maintain an effective quality management system, preferably one that conforms to ISO 9001:2000 Quality Management System – Requirements. In addition, the supplier must meet all other requirements of this manual.

### **1.2 Quality Manual and Procedures**

The supplier, as requested, will furnish Metalbuilt LLC with a copy of the supplier's Quality Manual and supporting procedures. This includes detailed documents and work instructions specific to production of material for Metalbuilt LLC.

### **1.3 Control of Sub-tier Suppliers**

Suppliers are responsible for the quality of materials and components provided by their sub-tier suppliers and sub-contractors. Metalbuilt LLC suppliers must impose controls on their sub-tier suppliers that provide quality results and documentation comparable to the controls applied to suppliers by Metalbuilt LLC. The extent of the controls may vary, depending on the nature and complexity of the product and processes, but should normally include:

- Evaluation and qualification of sub-tier supplier facilities
- Control to ensure that raw materials used meet Metalbuilt LLC's requirements
- Controls to ensure that the sub-tier suppliers of components used are those approved by Metalbuilt LLC, where applicable.
- Ensure that sub-tier suppliers have an ESD control program that meets or exceeds the needs of Metalbuilt LLC if the parts or materials are ESD sensitive.
- Part qualification, including first article inspection and process capability studies of as applicable.
- Control of drawings/revisions
- Control of nonconforming material
- Corrective action and preventive action programs
- A continuous quality improvement program
- Ensure sub-tier suppliers are conducting business ethically

Where appropriate, Metalbuilt LLC may specify the sub-tier suppliers that may be used, evaluate and qualify the sub-tier supplier's facilities, and assist the supplier in controlling the sub-tier supplier. Typically, this occurs when the sub-tier supplier is an essential component of the supply-chain process. *Metalbuilt LLC reserves the prerogative to evaluate the quality system and records of such sub-tier suppliers as necessary. In the event of Metalbuilt LLC's involvement, it does not absolve suppliers of the ultimate responsibility for the quality performance of their sub-tier suppliers. Metalbuilt expects its suppliers to conduct business in an ethical way.*

## **2.0 Supplier Qualification Process**

All suppliers of production materials to Metalbuilt LLC must be qualified suppliers. The extent of the qualification process is dependent upon the criticality of product purchased and other factors determined by Metalbuilt LLC. The qualification process in its most complete form consists of three parts:

- A questionnaire/self assessment completed by the supplier.
- A quality management document review if applicable
- An on-site assessment by Metalbuilt LLC personnel or their authorized agents if applicable

Metalbuilt LLC periodically reevaluates suppliers through the use of quality performance data and/or on-site assessments.

### **2.1 New Supplier Questionnaire/Self-Assessment**

In the early stages of the supplier selection process, potential suppliers are sent a questionnaire. This questionnaire solicits general information about the company such as location(s), size, capabilities, and financial stability as well as detailed questions regarding the Company's quality management system and quality history.

### **2.2 New Supplier Quality Documents (If applicable)**

If applicable, the new supplier will send a copy of their quality manual and supporting documents. A new supplier's quality documents will be required if the purchasing manager deems the new supplier questionnaire is insufficient to determine the supplier eligibility. Metalbuilt LLC will review the quality manual, procedures, and survey to determine if the documented quality system meets Metalbuilt LLC's requirements.

### **2.3 On-Site Assessment**

For suppliers of critical components, an on-site assessment of the supplier's facility is performed. The on-site assessment includes three components:

- A quality assessment to determine whether the supplier's quality management system is in place and functioning effectively.
- A business assessment to determine whether the supplier has financial resources, production capacity, and other business resources needed to fulfill Metalbuilt LLC's production needs.
- A technology assessment to determine whether the supplier has the needed technical resources, including production and inspection equipment, facilities, engineering resources, etc.

If the assessment team determines that the supplier meets Metalbuilt LLC's requirements, Metalbuilt LLC qualifies the supplier to bid on new business and supply production materials.

### **2.4 Periodic Reevaluation**

Metalbuilt LLC periodically reevaluates current production suppliers through the use of quality performance data and/or on-site assessments. If requested, the supplier shall make their facility available for on-site process verification by Metalbuilt LLC personnel, with reasonable notice.

### **3.0 Part Qualification**

The supplier is responsible for submitting all First Article data requested by Metalbuilt LLC. Metalbuilt LLC and the supplier will agree on the number of the samples to be checked and submitted with the first article data. Where possible, all documents should be submitted to the supplier quality engineer in electronic format (preferably Adobe Acrobat or Microsoft Office).

In some cases Metalbuilt LLC personnel may wish to be present during the initial production run. This will allow Metalbuilt LLC to validate and verify the process before any product is shipped

#### **3.1 First Article Requirements**

For each new or changed part, Metalbuilt LLC will communicate the information that must be submitted for qualification of the component or assembly for production.

#### **3.2 Dimensional Inspection Report**

Metalbuilt LLC notifies the supplier of the quantity of parts to be inspected, typically five from each tool or cavity. The supplier inspects or tests each sample for all dimensions, drawing notes, and specification requirements listed on the current revision of the Metalbuilt LLC drawing and/or specification. The supplier records the results. The supplier numbers a copy of Metalbuilt LLC's drawing and/or specification to correspond with the supplier's results.

The dimensional inspection report must include the specification number, specified requirements, and the inspection/test results. A simple statement that the material meets the requirements is not acceptable. Each report must be traceable to the supplier's material, through lot/heat/coil/batch numbers or equivalent, and must be signed by the organization that performed the testing. For any requirements that the supplier does not have the equipment to inspect or test, the supplier may obtain reports from their sub-supplier or other test agency.

Parts inspected for the dimensional inspection report are randomly selected from a production run of parts. The minimum quantity for the production run is agreed upon between the supplier and Metalbuilt LLC. The parts must be produced under volume-production conditions, including material, machines, tooling, processing parameters, cycle times, etc. Any exceptions to the volume-production conditions must be approved in writing by Metalbuilt LLC, and included in the data package submitted to Metalbuilt LLC.

#### **3.3 Material Certification/Test Report**

When requested, the supplier must provide a material certification/test report. This report must include the specification number, specified material and/or physical requirements, and the inspection/test results. A simple statement that the material meets the requirements is not acceptable. Each report must be traceable to the supplier's material, and must be signed by the organization that performed the testing.

#### **3.4 Gage Repeatability & Reproducibility (R&R) Studies**

For those characteristics specified by Metalbuilt LLC, the supplier must perform gage R&R studies using procedures described in Measurement Systems Analysis published by AIAG. Metalbuilt LLC must approve R&R values greater than 10 percent of the tolerance.

Normally for variable gages, three different operators measure ten samples three times each. For attribute gages, the Attribute Gage Study (long method) is required. Metalbuilt LLC must approve any alternative methods.

### 3.5 Gage Correlation Studies

For characteristics specified by Metalbuilt LLC, the supplier must perform a gage correlation study. This consists of the supplier identifying, measuring and recording a specified number of production parts. The supplier then sends the parts to Metalbuilt LLC for measurement. Metalbuilt LLC compares their measurements with the supplier's measurements to determine the correlation between the gages.

### 3.6 Process Capability Studies

Process Capability ( $C_{pk}$ ) is a comparison of the inherent variability of a process output to specification limits *under statistically stable conditions*. There are a number of techniques for assessing the capability of processes. Metalbuilt LLC suppliers must use methods defined in Statistical Process Control (SPC) published by AIAG for determining process capability and process performance, unless an alternate method is approved in writing by Metalbuilt LLC.

A  $C_{pk}$  of at least 1.33 is required for Metalbuilt LLC critical dimensions.

When required to submit process capability data to Metalbuilt LLC, the supplier must calculate process capability using the following method, unless an alternate method is approved by Metalbuilt LLC:

$$C_p = \text{Process capability ignoring process centering} = \frac{USL - LSL}{6 \hat{\sigma}}$$

$$C_{pk} = \text{Process capability including centering} = \text{the minimum of either: } \frac{USL - Avg.}{3 \hat{\sigma}} \text{ or } \frac{Avg. - LSL}{3 \hat{\sigma}}$$

USL = Upper Specification Limit

LSL = Lower Specification Limit

Avg. = Process Average =  $\bar{X}$

$$\hat{\sigma} = \text{Estimated Standard Deviation} = \frac{\bar{R}}{d_2}$$

$\bar{R}$  = Average Range

$d_2$  = Constant from statistical tables

For unilateral tolerances, the same logic is employed, except that only the specified side of the tolerance is used to calculate  $C_{pk}$ . When  $\bar{X}$  &  $R$  charts are used for capability studies, the subgroups must contain pieces taken consecutively from the process and the subgroups must be arranged sequentially in the order they were produced.

### 3.7 Failure Modes and Effects Analysis (FMEA)

When requested, the supplier must perform a Process Failure Modes and Effects Analysis (PFMEA), and submit it for approval. For parts and assemblies that are designed by the supplier, the supplier should also perform a Design Failure Modes and Effects Analysis. The PFMEA considers all reasonably foreseeable potential failure modes of each process. Based on the potential seriousness and likelihood of the problem, the supplier develops manufacturing controls. The PFMEA should be a living document, and should be updated when process changes occur, or when defective material is produced. PFMEA methods and examples can be found in Potential Failure Mode and Effects Analysis published by AIAG.

### 3.8 Control Plan

When requested, the supplier must develop a control plan, and submit it for approval. The control plan and is a detailed description of the supplier's proposed processing steps required to produce the part, and the controls that are put into place to control the quality at each step. The control plan must include all in-house processing, external processing, inspection, packaging, and shipping. Suppliers may use their

own format. Measuring devices and fixtures designed and built to check Metalbuilt LLC parts must be identified with a gage number and drawing, and must be listed on the control plan.

The control plan must include all critical characteristics. Where detailed instructions are required, the supplier details those instructions in a work instruction, or equivalent, which must be listed in the control plan. Inspection methods, sample sizes, and sampling frequencies should be based on the process capabilities, seriousness and likelihood of potential non-conformances, and process stability. Critical characteristics that do not meet Metalbuilt LLC's process capability requirements must be inspected 100%, unless Metalbuilt LLC approves alternate control methods in writing.

### **3.9 Electrostatic Discharge (ESD) Susceptibility**

When components or assemblies supplied to Metalbuilt LLC are susceptible to ESD, the supplier shall establish ESD susceptibility information for them. Procedures, methods, and equipment used for determining the ESD susceptibility shall be provided to Metalbuilt LLC. ESD failure modes shall be considered in PFMEAs, and ESD controls shall be included in control plans and packaging.

### **3.10 Material Safety Data Sheets (MSDS)**

As applicable, Material Safety Data Sheets (MSDS) must be provided during First Article process.

### **3.11 Agency Approvals and Compatibility Reports**

The supplier is responsible to provide the proper agency approval test reports per Metalbuilt LLC requirement. Examples are UL, CE, FCC, TUV, etc. The supplier is also responsible for agency test reports from their sub-supplier or other outside test agencies.

The supplier is responsible to submit test results that verify compatibility as required (USB, 1394 etc.). Testing may be done by the supplier or by a test facility certified by the supplier.

### **3.12 Packaging & Labeling**

The supplier must adequately plan for packaging of material shipped to Metalbuilt LLC. The supplier will provide a documented packaging plan including container size, number of parts per container, packaging configuration, etc. Packaging will be designed to provide protection from any damage that may occur. For static sensitive components, ESD packaging shall be provided. Packaging, labeling, and shipping materials must comply with the requirements of common carriers to secure the least transportation costs.

### **3.13 Traceability**

The supplier must plan for traceability of components. The supplier will provide a written plan specifying how components will be marked with serial or lot numbers and date codes if required, or how containers will be identified with lot numbers or date codes if component marking is not required. The plan will also include sizes of lots or batches. Where possible, batch sizes should be minimized to aid in containment should quality problems be found.

## 4.0 Manufacturing Control

### 4.1 Process Control

Metalbuilt LLC suppliers are required to control all manufacturing processes in accordance with the control plan, which is approved during part qualification.

### 4.2 Statistical Process Control

Where specified in the control plan, the supplier is required to apply effective statistical process controls. Effective controls must include:

- The control chart displays control limits that are correctly calculated (specification limits may not be used as control limits).
- The control chart is at the process area, visible to the operator, or persons who are responsible for controlling the process.
- For each out-of-control condition, actions are taken to bring the process back into control. Actions taken to bring the process back into control are recorded.
- Product produced during any out-of-control condition is sorted, scrapped, reworked or dispositioned through the supplier's material review process

### 4.3 Process Performance Requirements

Process Performance ( $P_{pk}$ ) is the comparison of the actual process variation to the specification limits. When required to submit process performance data to Metalbuilt LLC, the supplier must report process performance using the following method:

**Critical Characteristics:** A  $P_{pk}$  at least 1.33 is required. Any critical characteristic failing to meet the minimum requirement requires a containment plan and an improvement plan.

**Other Characteristics:** A  $P_{pk}$  of at least 1.00 is required. The supplier is not required to calculate and report process performance for non-critical characteristics, unless requested by Metalbuilt LLC. When specified by Metalbuilt LLC, other characteristics failing to meet the minimum requirement also require a containment and improvement plan.

$P_{pk}$  = the minimum of either

$$\frac{USL - Avg.}{3s} \quad \text{or} \quad \frac{Avg. - LSL}{3s}$$

USL = Upper Specification Limit

LSL = Lower Specification Limit

Avg. = Process Average =  $\bar{x}$

s = Estimated Standard Deviation

n = Total number of parts inspected

$$s = \sqrt{\frac{\sum_{i=1}^n (x_i - \bar{x})^2}{(n - 1)}}$$

For unilateral tolerances, the same logic is employed, except that only the side of the tolerance that is specified is used in to calculate  $P_{pk}$ .

### 4.4 Process Improvement

Out-of-control or unstable processes (which have assignable causes) and processes that do not meet the minimum  $C_{pk}/P_{pk}$  requirements must be identified and corrected. The Supplier must also improve processes with low yield rates.

### 4.5 Lot Control

A lot consists of product of one part number and revision that are made at the same time, under the same processing conditions, from the same lot of raw materials. The primary purpose for identifying lots is to determine the scope of actions that must be taken when problems arise during further manufacturing or



with customers. Each container of material shipped to Metalbuilt LLC must be identified with the Supplier's lot number. Inspection records must be traceable to lot numbers.

The following are typical conditions that result in a change of lot numbers:

- Change of part number or revision
- Change of part number or revision of components
- Interruption of continuous production (typically for more than a few hours)
- Repairs or modification to the tooling or equipment
- Tooling changes (other than minor adjustment or replacement of consumable tooling)
- Change to a different lot of raw materials
- Process changes

#### **4.6 Traceability**

Traceability ties finished product back to the components used in the product. When traceability is specified, the traceability marking should be effective down to the individual component, i.e., lot code, batch or serial should be identifiable throughout Metalbuilt LLC's processes.

#### **4.7 Workmanship**

When workmanship standards are not referenced on Metalbuilt LLC drawings or specifications, the supplier is expected to follow industry-accepted standards (e.g. ANSI, IPC). When in doubt, consult with Metalbuilt LLC for clarification.

#### **4.8 Safety**

At no time should any customer, or person at a Metalbuilt LLC facility, be exposed to hazardous material or situations that are not inherent in a component's structure. Residues, films, out-gassing products and packaging materials should comply with OSHA (Occupational Safety & Health Association) standards. For items with inherent hazards, safety notices must be clearly observable. As applicable, MSDS sheets must be provided during the First Article process.

#### **4.9 Maintenance**

The supplier must maintain all facilities, manufacturing machines, tools, measuring devices, and other equipment in such a manner that the supplier can support Metalbuilt LLC's production requirements, and the quality of parts manufactured for Metalbuilt LLC is not degraded in any way.

#### **4.10 Electrostatic Discharge (ESD) Controls**

If the supplier furnishes ESD-sensitive materials, the supplier must maintain an effective ESD program that meets all requirements for the material produced.

## 5.0 Drawings/Changes

### 5.1 Drawing and Change Control

The supplier must have a documented system for assuring that the latest Metalbuilt LLC drawings are in effect at their facility. The supplier's quality management system must contain a documented procedure that describes the method used for the receipt, review, distribution, and implementation of all changes to drawings and specifications. In addition, the procedure must address control of obsolete drawings and specifications. A documented procedure should also detail the method used to contain new or modified parts until approved by the customer.

### 5.2 Process Changes, Engineering Changes

Suppliers must have systems in place to control changes to drawings, specifications, processes, or produced parts. Systems should be capable of handling changes being requested by the customer, and also changes requested by the supplier.

**NOTE:** The First Article approval process is directed at a given part number for a specified revision level produced in a specific area of the manufacturer's facility. **Suppliers may not make any changes in their process, location, material, or to the part without written approval from Metalbuilt LLC.** The supplier must formally request a process change on all Metalbuilt LLC components.

### 5.3 Supplier Process Change Request (SPCR)

A Supplier Process Change Request (SPCR) is used to request a change to a released part, process, drawing, or specification. Metalbuilt LLC encourages SPCRs for process improvement with the stipulation that before an SPCR is submitted, the supplier thoroughly reviews their FMEA and control plan to assure that all process-related issues have been addressed and resolved.

The originator of an SPCR includes the following information:

- Drawing or part number
- Drawing or part title
- Description of problem or recommended change
- Reason for change or "rationale"
- Proposed effective date

The supplier submits the SPCR with the revised FMEA and control plan (if applicable) to Metalbuilt LLC for evaluation of the following:

- Supplier-demonstrated process capability and stability
- Comparison to First Article data
- Industry standards
- Supplier process engineering capabilities
- Supplier's adherence to control plan

After Metalbuilt LLC has completed the review, and concurs with the supplier, Metalbuilt LLC will notify the supplier as to the final disposition of the SPCR and part submittal requirements and dates.

**When monitoring is required, the appropriate markings must be identified on the lots etc. for a specified time frame as decided jointly with Metalbuilt LLC and the supplier.**

### 5.4 Supplier Deviation Request

A supplier is never permitted to knowingly ship product that deviates from the print, specification limits, or design intent without written authorization from Metalbuilt LLC. If such a condition exists, the supplier may request Metalbuilt LLC to allow shipment of the product. This is accomplished by initiating a Deviation Request.

If directed by Metalbuilt LLC, the supplier must send samples of non-conforming items to Metalbuilt LLC for evaluation. The cost of any testing required to determine the acceptability of the product will be charged to the supplier. Metalbuilt LLC will determine the item's acceptability and what corrective actions (if any) are required beyond the deviation. If approved, Metalbuilt LLC will send a written deviation approval to the supplier.

The deviation is only intended to be an interim action and **is not** to be construed as an engineering change. The supplier must begin work immediately to correct the condition in question. This must be accomplished within the time frame stated on the deviation. Failure to comply with the mutually agreed upon closure date for the deviation may result in the supplier's rating being affected.

In all cases, the supplier must fully contain all product suspected of being non-conforming at their facility. In addition, the supplier may be required to sort any suspect product at Metalbuilt LLC.

**Any parts sent to Metalbuilt LLC that have been approved on a Deviation must be clearly identified on the box, container, or other packaging method with the appropriate markings decided jointly by Metalbuilt LLC and the supplier.**

## **6.0 Packaging & Labeling**

### **6.1 Packaging**

Each supplier must adequately plan for packaging. Metalbuilt LLC encourages supplier-initiated packaging improvements. Suppliers will provide packaging that provides protection from any damage that may occur. Packaging, labeling, and shipping materials must comply with the requirements of common carriers, in a manner to secure the lowest transportation costs.

Packaging for ESD sensitive items must meet appropriate ESD packaging requirements. Contamination is a serious concern to Metalbuilt LLC. Packaging must protect the components from contamination, including fibers from the packaging materials.

Expendable materials and packaging must be legal and safe for standard “light industry” disposal. The preferred maximum weight of manually handled packs is 40 lbs. The maximum acceptable weight is 45 pounds, unless approved by Metalbuilt LLC in writing.

Whenever possible, only one part number and one supplier lot is to be packaged in a shipping container. When more than one part number or lot number is packaged in a shipping container, each part number and/or lot number must be separately packaged (i.e. bags or boxes) inside the container, with each labeled as to the contents.

### **6.2 Labeling**

Each shipping container or inside package must contain the following information:

- Metalbuilt LLC part number (if no Metalbuilt LLC number exists, supplier part number is used)
- Quantity
- Supplier's Name
- Purchase Order Number
- Lot identification (if required)
- Required ESD Susceptibility Label on packaging for ESD sensitive items, using the Electronic Industries Association Standard EIA-471 symbol or equivalent.

## 7.0 Corrective Action System

Metalbuilt LLC requires suppliers to utilize a closed-loop corrective action system when problems are encountered in their manufacturing facility, or after nonconforming product has been shipped to Metalbuilt LLC.

### 7.1 Corrective Action Process Approach

The corrective action system utilized should be similar to the process outlined below. The focus should be on identifying the root cause(s) of the problem and taking action to prevent its recurrence.

- Use a team approach
- Describe the problem
- Contain the problem
- Identify and verify root causes(s)
- Implement permanent corrective actions
- Verify corrective action effectiveness
- Close the corrective action

### 7.2 Supplier Corrective Action

Metalbuilt LLC issues an 8D to a supplier when non-conforming parts are found at incoming inspection, in production, in test, or by a Metalbuilt LLC customer. They can also be issued as a result of a supplier audit. The supplier is required to respond by returning the 8D back to Metalbuilt LLC with the “Team Response” fields completed. The following provides a brief outline of the 8D procedure that suppliers to Metalbuilt LLC should comply with:

- Metalbuilt LLC requires that the supplier take immediate containment action upon notification of the nonconformance. The supplier must submit a written response to Metalbuilt LLC, reporting the Supplier’s initial observation and defining the interim containment plan within 48 hours of notification. The Supplier’s Initial Observation is an acknowledgement that the Supplier has been informed of the problem, and has begun to gather information about the problem.
- The containment plan must clearly define the containment actions at the supplier’s facility to assure that no nonconforming product is shipped to Metalbuilt LLC. If suspect product has already been shipped, the supplier must address all suspect stock in transit and any stock at Metalbuilt LLC. The supplier will assist Metalbuilt LLC in identifying customer risk by identifying all suspect lot numbers and associated quantities involved.
- Within 2 weeks after the original notification, the supplier must report the results of the Supplier’s investigation into the cause of the problem.
- Within 3 weeks from the initial notification date, the supplier must submit the corrective action to be taken to prevent recurrence of the problem, and the effectivity date (the date the corrective action will be implemented.). Actions such as “train the operator,” “discipline the operator,” or “increase inspection,” are typically not acceptable corrective actions.
- The supplier is required to keep Metalbuilt LLC informed of progress towards implementing the corrective action. When corrective action implementation is complete, the supplier and Metalbuilt LLC verify that the corrective action is effective in preventing the problem’s recurrence.

## 8.0 Ship-to-Use (STU)

Metalbuilt LLC utilizes a Ship-to-Use (STU) policy to reduce the problems associated with receiving nonconforming product from suppliers, while minimizing incoming inspection and speeding up the process of moving product to production.

Suppliers with all parts on STU and high ongoing quality performance are Preferred Suppliers. Preferred Suppliers are given first opportunity to quote for new business and are given preference for increased volumes when consolidating suppliers for multiple-source items.

Metalbuilt LLC administers the STU program on a part-by-part basis. STU applies to all material and components purchased for use in released product at Metalbuilt LLC. It does not include pre-released parts, samples, prototypes, pilot runs, First Articles for new tooling, and other low volume applications. STU material will be moved directly into production, bypassing incoming inspection.

### 8.1 Ship-to-Use Requirements

The supplier attains Ship-to-Use status with each proposed part by meeting the following criteria:

- For non-critical parts, the part achieves STU status upon First Article qualification, assuming all other requirements are met as detailed below.
- For critical parts, the supplier must be qualified through an on-site quality management system assessment. At Metalbuilt LLC's discretion, the formal on-site assessment may be waived with a fully completed supplier self-assessment.
- For critical parts, the most recent three lots received must have passed all incoming inspections
- The part must have no outstanding corrective action requests (8Ds) for issues affecting form, fit, function, reliability, or customer acceptance.
- The 3-lot requirement may be waived for a critical part if any of the following conditions are met, the provided a mutual agreement is reached between Metalbuilt LLC and the supplier:
  - The part was modified from an existing part on STU by a part number or revision change, and the changes did not affect form, fit or function.
  - The part has less than 3 lots received within 6 months.
- For products shipped as complete, sealed, point-of-sale items from the supplier, Metalbuilt LLC will determine if that product may be placed as STU immediately. This decision is based on the supplier test and manufacturing process/capability and availability of equipment to do meaningful testing.

If a supplier produces a part in more than one facility, each facility must qualify individually for STU.

### 8.2 Ship-to-Use Suspension

The supplier is placed on STU suspension when any of the following conditions occur:

- A lot fails an incoming inspection audit.
- A supplier-caused 8D is initiated for an issue affecting form, fit, function, reliability, or customer acceptance.
- The supplier fails a quality management system assessment.
- A control plan audit shows the supplier is not following their approved control plan.

If STU is suspended, Metalbuilt LLC personnel investigate and determine whether the suspension extends to other part numbers/tools furnished by that supplier, issues an 8D if an 8D has not already been issued, and works with the supplier to correct the problem.

When the supplier's STU status is returned to good standing, Metalbuilt LLC notifies the supplier of the change in status.

If a supplier does not implement effective corrective action, or if the supplier is put on suspension repeatedly, Metalbuilt LLC determines whether the supplier's STU status should be discontinued. This decision may also include a decision to move the business to an alternate supplier.

## **9.0 Supplier Monitoring**

Metalbuilt LLC continually monitors its suppliers to ensure they continue to meet Metalbuilt LLC's requirements, and to ensure that the supplier continues to ship acceptable parts. This may consist of:

- A quality management system surveillance audit at the supplier's facility
- An on-site audit of the supplier's control plan
- A random incoming inspection audit of a batch of product
- Source inspection of product at the supplier's facility
- Nth Article Inspection
- Review of supplier-furnished data packages
- A supplier progress review meeting conducted periodically at the supplier's site or Metalbuilt LLC to review supplier performance and progress

### **9.1 Supplier Audits**

Periodically, Metalbuilt LLC may audit the supplier's quality management system. The supplier must make their facility available for on-site process verification by Metalbuilt LLC personnel at any time, with reasonable notice. This may be a full or abbreviated documentation and on-site audit. The purpose is to evaluate any changes that may have occurred in the supplier's quality management system, and to assess the supplier's continuing commitment to quality improvement.

Periodically, Metalbuilt LLC may also audit the supplier's continuing conformance to the control plan approved in the First Article process.

### **9.2 Inspection Audits**

Metalbuilt LLC expects its suppliers to furnish material that conforms to all requirements, and that does not need to be inspected when Metalbuilt LLC receives it. Material that has not achieved Ship-to-Use status, or that is on STU suspension is inspected on a lot-by-lot basis. Metalbuilt LLC uses a C=0 sampling plan (see example in Appendix 1) that rejects the entire lot when a single non-conforming part is found in the sample. At Metalbuilt LLC's discretion, in order to meet production requirements, 100% sorting may be done as necessary at the supplier's expense.

Metalbuilt LLC may inspect product at the supplier's facility to detect potential problems prior to shipment. Metalbuilt LLC may also inspect product at sub-tier suppliers.

### **9.3 N<sup>th</sup> Article Inspection**

The supplier must perform annual Nth Article inspections of each critical part to verify continuing conformance of the part to the specification. This is also required if an engineering change affecting form, fit, or function occurs. The Nth Article requirement is not applicable to non-critical parts.

For all sub-components, the manufacturing supplier is responsible to ensure that the components that make up each assembly are qualified and monitored through the supplier's own part qualification system.

At the discretion of Metalbuilt LLC, Nth Article can be postponed beyond, or required prior to, the annual expiration. Considerations such as component volume, program life cycle and supplier/part performance are used in the decision to pull in or extend the requirement for Nth Article.

### **9.4 Supplier-Furnished Lot Documentation**

Metalbuilt LLC may require the supplier to furnish inspection, test, process performance, or other quality data with each shipment to ensure that the product meets Metalbuilt LLC's requirements. When data submission is required, the data must accompany each shipment, or be e-mailed or faxed to Metalbuilt LLC at the same time the lot is shipped. All documentation must be clearly identified with Metalbuilt LLC's part number, and the supplier's lot number.

When specified by Metalbuilt LLC, the supplier must submit monthly data packages. Data packages typically consist of copies of control charts and process capability calculations for specified characteristics.

Once the supplier has completed two consecutive quarters of data submissions, the supplier may request elimination of the data submission if records show that the characteristic consistently satisfies Metalbuilt LLC's requirements for process stability and process performance, and if the characteristic has caused no problems in Metalbuilt LLC's production. Metalbuilt LLC will notify the supplier in writing if the data submission may be discontinued.

# Appendix 1

## C = 0 SAMPLING PLAN

LOT SIZE	SAMPLE SIZE															
	.010	.015	.025	.040	.065	1.0	.15	.25	.40	.65	1.0	1.5	2.5	4.0	6.5	10.0
2 to 8	*	*	*	*	*	*	*	*	*	*	*	*	5	3	2	2
9 to 15	*	*	*	*	*	*	*	*	*	*	13	8	5	3	2	2
16 to 25	*	*	*	*	*	*	*	*	*	20	13	8	5	3	3	2
26 to 50	*	*	*	*	*	*	*	*	32	20	13	8	5	5	5	3
51 to 90	*	*	*	*	*	80	50	32	20	13	8	7	7	6	5	4
91 to 150	*	*	*	*	*	125	80	50	32	20	13	12	11	7	6	5
151 to 280	*	*	*	*	200	125	80	50	32	20	20	19	13	10	7	6
281 to 500	*	*	*	315	200	125	80	50	48	47	29	21	16	11	9	7
501 to 1200	*	800	500	315	200	125	80	75	73	47	34	27	19	15	11	8
1201 to 3200	1250	800	500	315	200	125	120	116	73	53	42	35	23	18	13	9
3201 to 10,000	1250	800	500	315	200	182	189	116	86	68	50	38	29	22	15	9
10,001 to 35,000	1250	800	500	315	300	294	189	135	108	77	60	46	35	29	15	9
35,001 to 150,000	1250	800	500	490	476	294	218	170	123	96	74	56	40	29	15	9
150,001 to 500,000	1250	800	750	715	476	345	270	200	156	119	90	64	40	29	15	9
500,001 and over	1250	1200	1112	715	556	435	303	244	189	143	102	64	40	29	15	9

\*Indicates entire lot must be inspected  
 NOTE: The Acceptance Number in all cases is ZERO.