



## **Report Number B0622**

# **Requirements for Sellers of Special Tooling to the Boeing St. Louis Tooling Center**



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### Index of Page Changes

Revision Date and Letter	Pages Affected			Remarks	Revised By	Approved
	Revised	Added	Removed			
H: 1/27/2010				Total General Revision of Entire Document	J.Weiland	J. Hale
I: 6/11/2012	pg 4 scope			"This document is applicable to Sellers of the Boeing St. Louis Tooling Center when fabricating, changing or reworking special tooling accountable to Boeing."	J.Weiland	J. Hale
J: 7/24/2012	ALL			Multiple Formatting Corrections. Changed all instances of "suppliers" with "sellers."	J.Weiland	J. Hale

## 1.0 Scope

This document is applicable to Sellers with authorized tooling work orders issued from Boeing St. Louis Tooling Center when fabricating, modifying or reworking special tooling accountable to Boeing.

### 1.1 Relation to Other Contract Requirements

The provisions of this document are in addition to and complementary with other contract requirements.

### 1.2 Definitions

**Special Tooling (ST):** Jigs, dies, fixtures, molds, patterns, other equipment and manufacturing aids, all components of these items, and replacement of these items, which are of such a specialized nature that without substantial modification or alteration their use is limited to the development or production of particular services or parts thereof or to the performance of particular services. It does not include material, special test equipment, facilities (except foundations and similar improvements necessary for installing special tooling), general or special machine tools, or similar capital items.

**Design Tools:** Special Tools (ST) initiated by a Boeing - St. Louis tooling work order, fabricated and inspected in accordance with Tool Engineering information and Tool Process Instruction Manual (TPIM).

**Nondesign Tools:** ST, which can be fabricated from tooling work order information, sketches and Tool Fabrication Instruction Manual (TFIM) data as required. ST built to manufacturer catalog specifications or Boeing specification (other than Boeing tool drawing).

**NOTE:** Special tooling does not include material, special test equipment, facilities, general or special machine tools or similar capital items.

**Contractor Furnished Property (CFP):** Property, other than government material, furnished by Boeing for discharging contractual obligations includes Contractor Furnished Equipment.

**Rework:** Returning ST to previously accepted definition configuration without altering fit, form or function.

**Modification:** ST engineering definition changes potentially affecting fit, form, or function of parts or assemblies.

## 2.0 Applicable Documents

### 2.1 Boeing and Government Documents:

2.1.1 Tool Process Instruction Manual (TPIM)

2.1.2 Tool Fabrication Instruction Manual (TFIM)

2.1.3 Boeing Process Specifications

**NOTE:** Additional documents may be required as part of the Sellers procurement contract.

Seller shall initiate coordination and negotiation with an authorized Boeing procurement representative for proper applicable documents.

## 3.0 ST Inspection Requirements:

### 3.1 Seller Responsibilities:

3.1.1 The Seller shall have inspection processes consistent with D950-11059-1 BDS Seller Special Tooling Requirements and meet the requirements prescribed in this document.

3.1.2 The Seller shall provide or be provided by Boeing St. Louis, a suitable set of steel and rubber quality inspection acceptance stamps for verification purposes.

3.1.3 Miss-use of a quality stamp can result in removal from the Boeing Tooling Seller Base.

3.1.4 Inspection stamps shall be unique to the Seller and controlled in such a manner as to be traceable to the user.

**NOTE:** These stamp designs shall be unique to the Seller, must be no greater than 3/8" in diameter.

3.1.5 When Seller is not capable of performing fabrication, rework, and modification, Seller shall take the appropriate actions to ensure work is accomplished. Typical options include

3.1.5.1 Ship ST to Boeing for fabrication, rework, and modification.

3.1.5.2 Fabrication, rework, and modification performed by Boeing at Seller's site.

- 3.1.5.3 Third-party fabrication, rework, and modification arranged by Seller meeting the capability requirements of section 4.
- 3.1.5.4 If tool inspection is delegated, this must be in compliance with section 8 of D950-11059-1 (excluding Boeing capability assessment, the Seller is responsible for having a documented process and determining third-party capability when engaging a third party) and any applicable Boeing contractual requirements.

### 3.2 Tool Build Log:

- 3.2.1 Entries on all Tool Build Logs must be made in an accurate, neat, and recorded in a legible manner. These records indicate the progressive and final inspection of a tool. Therefore the records must be kept current and accurate.
- 3.2.2 After a tool is complete and the Tool Build Log is accepted, the Tool Build Log shall be kept on file by the Seller for a minimum of seven years. A copy of these records must accompany the tool upon shipment to the designated Boeing facility.
- 3.2.3 Before final acceptance of a tool, the Seller's tool inspection will:
  - 3.2.3.1 Review the Tool Build Log for completeness and accuracy, making sure all critical dimensions on the tool is recorded, acceptance stamped, and dated.
  - 3.2.3.2 Verify that all loose and removable details are identified and nested per TPIM requirements.
  - 3.2.3.3 Insure that all tooling details with critical dimensions of (+/- .015 and less) are inspected and bare proof of quality acceptance stamped or etched on them.
  - 3.2.3.4 Insure that all setting dimensions, feeler dimensions, gaps and etc., with a tolerance of + or - .015 or less are inspected and documented in the Tool Build Log.
  - 3.2.3.5 Verify that all drawing notes and applicable TPIM and TFIM specifications have been complied with.

### 3.3 Seller Generated Quality Inspection Data

In certain instances Boeing may elect to require the Seller provide all

data from coordinate measuring systems used in the inspection process. Under those conditions the following criteria would apply: The Seller would provide all quality and fabrication requirements. The Seller will supply sufficient data to insure conclusive validation of their efforts. All program and quality records are considered Boeing property and shall, as directed, be submitted to Seller tooling quality management through the appropriate Boeing procurement representative for review and concurrence prior to the shipment of the tool from the Seller's facility, or upon completion of inspection. If on review, representatives of Boeing deem that the information provided is insufficient to reflect the true condition of the modeled tool, it is the Seller's responsibility to provide supplemental readings and measurements and master definition.

CMS Reports must be maintained in accordance with this document to support ST inspection acceptance (e.g. any files, job information, coordinate system establishment, object temperature, scale bars, drift points, data analysis and measured results). Reports shall be in English and in inches unless directed otherwise by customer contract.

#### 3.4 Seller Stamping Instruction

Sellers with appropriate approval to D950-11059-1 for ST Acceptance are authorized to ship tooling to Boeing, or use internally without traditional Boeing source inspection or unless otherwise specified on contract.

- 3.4.1 The Seller can only use a quality stamp on tools that accompany either a Boeing - St. Louis tooling work order or purchase contract issued through the Boeing Tooling Procurement Organization, unless otherwise specified on contract.
- 3.4.2 Under no condition is a Sellers Tooling Stamp ever to be used on a Boeing production part or its accompanying paperwork.
- 3.4.3 The use of this Seller's quality stamp in an unauthorized manner may result in suspension of the sellers tooling approval and subsequent removal from the Boeing Tooling Seller base.

#### 3.5 Required Process Certification

- 3.5.1 It shall be the Seller's responsibility to furnish certificates of conformance signed by an authorized representative of the company, verifying compliance to processes as applicable, to Boeing upon request.
- 3.5.2 A certificate of conformance to blue print specification shall be required on all proof loads, weld, heat treat, stress relief processes.



A copy of the certificate of conformance shall be included in the Tool Build Log.

- 3.5.3 Required certifications of proof load for hoisting tools shall be forwarded to the buyer to the attention of the Quality Tooling Office. One copy shall be attached to the shipping document.

### 3.6 Drawings and Changes

The Sellers inspection processes shall provide for procedures which will assure the latest applicable drawings, specifications and instructions required by the contract as well as authorized changes thereto, are used for fabrication, inspection and testing.

### 3.7 Indication of Inspection Status

The Seller shall maintain a process for identifying the inspection status of critical tooling details with a tolerance of (+/- .015 and less). Inspection verification shall be by means of rubber stamps and applied to tooling records and steel stamp on details as noted in Section 3.2.3. A nonconforming tool or detail should be handled in the manner prescribed in 3.9 of this document.

### 3.8 Boeing Furnished Material

When material or reference tooling is furnished by Boeing the Seller's procedure shall include, as a minimum, the following:

- 3.8.1 Examination upon receipt to detect damage in transit.
- 3.8.2 Inspection for completeness and proper type.
- 3.8.3 Periodic inspection and precautions to assure adequate storage to guard against damage from handling and deterioration.
- 3.8.4 Identification and protection from improper use.
- 3.8.5 Verification of quality.

### 3.9 Nonconforming Tooling

- 3.9.1 Nonconforming tooling shall be processed in accordance with requirements prescribed in D950-11059-1. Nonconformance's requiring Boeing disposition will be processed in accordance with Seller IR0451.





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# B0622 Appendix A – Tool Build Log Instructions

## 1. Scope

The Tool Build Log is used to record essential information while a tool is being fabricated or while incorporating a Tool Change Order (TCO).

## 2. Requirements

- 2.1. The Tool Order serves as the record of tool completion and conformance. The Acceptance stamp on the Tool Order signifies the tool is complete and meets all Tool Design Drawing Tool Order, or TFIM/TPIM requirements
- 2.2. The Tool Build Log indicates the progressive build and verification of a tool and should be kept with its respective tool until the tool is accepted. A Qualified Operator or an Inspector shall produce the Tool Build Log as appropriate during the tool fabrication process. The Tool Build Log may also be used when performing tool recheck.
- 2.3. The Seller shall produce a Tool Build Log, forward a copy to Boeing and maintain a copy for a minimum of 7 years.
- 2.4. Boeing Quality Tooling management may dispose of any unnecessary tool log information as appropriate.
- 2.5. Entries on all Tool Build Logs must be made in an accurate, neat, and legible manner.
- 2.6. Data being logged in conjunction with a make or Tool Change Order (TCO) should be logged on new Tool Build Log sheets. Logs for a TCO may be maintained with the original Tool Build Log, if one exists. Details for completing forms can be found in the following paragraph (5).
  - 2.6.1 Tool Build Log Summary (MAC1147S). This form shall be used to log events deemed pertinent during the fabrication or change of a tool.
  - 2.6.2 Tool Build Log Detail Accountability (MAC1147DA). This form shall be used to assure accountability of tooling details.
  - 2.6.3 Tool Build Log Construction Point Sketch (MAC1147CS). This form shall be used to log actual locations of construction points.
  - 2.6.4 Tool Detail Information (MAC1147DB). This form shall be used to log +/- .015 or less tolerance dimensions.

- 2.6.5 Tool Build Log Hole Pattern (MAC1147E). This form shall be used to log coordinates of hole patterns.
- 2.6.6 Tool Build Log Documentation (MAC1147D). This form shall be used to log documented dimensions when required by the tooling blueprint.
- 2.6.7 Tool nonconformance documents.
- 2.6.8 Quality Calibration Log (MAC5420). This form shall be used to list all essential calibrated M&TE tools used while a tool is being initially fabricated or while incorporating a Tooling Change Order (TCO). After a tool is completed and accepted, the Quality Calibration Log shall be retained unless specified by Boeing Quality Tooling management to be destroyed.
- 2.6.9 Laminate Tool Build Log (AM0044) shall be produced by a qualified operator or inspector during the fabrication of all Laminate Tooling. The Laminate Tool Build Log may be used in place of the Tool Build Log or as part of a Tool Build Log.
- 2.7 All tools shall require a Tool Build Log. A Seller may substitute Boeing forms for equipment Seller forms per the Sellers documented process.
- 2.8 To avoid excessive verification effort on less complex tools, the following procedures are acceptable.
  - 2.8.1 Account for details using a Tool Build Logs DA (MAC1147DA). Enter the actual dimension and an inspection stamp on the face of the tool drawing adjacent to the +/- .015 or less tolerance dimension being accepted. After the tool has been accepted, the stamped tool drawing shall be attached to the MAC1147DA form.
- 2.9 If the nonconformities have been reworked or the drawing has been changed, all obsolete entries in the tool build log that no longer conform are to be removed from the tool build log by drawing a single line through the entry. Do not use correction tape or corrective fluid. When the obsolete entries have been removed from the tool build log, enter the new dimensions in the same locations or on consecutive sheets. Enter the TCO number responsible for the drawing changes in the log REMARKS column.
- 2.10 Prior to closing out the work on a tool the Seller shall:
  - 2.10.1 Ensure that there are no open rejections outstanding.



2.10.2 Enter the Acceptance stamp and the date on the tool nameplate.

2.10.3 Enter the Acceptance stamp and the date on the Tool Order.

2.10.4 Forward the completed tooling build log to Boeing

### 3 Completion of Tool Build Log Summary (MAC1147S)

3.1 Tool No.: Enter complete tool number

3.2 Dup No.: Enter duplicate or unit tool number

3.3 Page \_ of \_: Enter 1 of 1, etc

3.4 Date Completed: Enter date accepted

3.5 Work Order Information: Enter a brief description of work accomplished. Some examples are:

3.5.1 Complete to B/P make

3.5.2 Complete to B/P through Tool Change Order (TCO) XX

3.5.3 TCO No. X voided by Tool Design X/X/XX

3.5.4 Rework per TCO XXX

3.5.5 Tool recycle comp. SN/XXX, recycled method

3.5.6 Tool nonconformance documents of historical value

3.5.7 Tool shipped to John Doe, address, etc.

3.6 \*Adv Rel: Enter an acceptance stamp in the Advance Release (ADV) column if the work has been accepted to a percent release drawing, a marked-up drawing, or other advance release information. Include an explanation of the reason for placing the acceptance stamp in the ADV column.

3.7 Firm Rel: Enter the stamp in the FIRM column to indicate unconditional acceptance.

**Note 1:** Before firm stamping the summary sheet, the operator should verify that the Detail Accountability Sheets and Detail Information Sheets are complete and accepted.

### 4 Completion of the Tool Build Log Detail Accountability (MAC1147DA)



- 4.1 Print the complete tool number and the tool duplicate or unit number (Orig., Dup 2, Unit 0002 etc) at the top of the Tool Build Logs DA page, along with the date.
- 4.2 In the proper column, enter the detail numbers in numerical sequence as shown on the tool drawing.
- 4.3 Enter the total quantity of each detail shown on the tool drawing in the next column.
- 4.4 Place a check mark in the column titled CRIT if the detail is a critically set locator or is coordinated to a reference tool or master tool. A critically set detail is any detail set to a tolerance equal to or less than +/- .015 of an inch. Critically set details shall be listed on a MAC1147DB, Tool Detail Information (TDI). Details with a tolerance greater than +/- .015 are noncritical locating dimensions and are not required to be listed on a TDI.
- 4.5 Enter the page number from the bottom of the TDI sheet that lists dimensional settings of the detail, or other pertinent information in the three columns titled DET., INFO, and PAGE NO., per Paragraph 6.
- 4.6 Place a check mark in the NON CRIT column if the detail is a noncritical part of the tool. This would include frame details, support details, etc.
- 4.7 Record any important descriptive information for respective details in the REMARKS column.
- 4.8 Affix stamp in ADV column when a detail is made and/or set to advance information. For noncritical details, the ADV Acceptance Stamp indicates accountability and conformance to specifications only. Indicate partial accountability of the total quantity in the REMARKS column when necessary.
- 4.9 Affix stamp in the FIRM column to show acceptance of the total quantity of details to the firm information. For the noncritical details, the firm Acceptance Stamp indicates accountability and conformance to specifications.
- 4.10 The Tool Build Logs DA sheet is continued on the opposite side. When practical, the Tool Build Logs DA sheet shall be completed on both sides before adding a new sheet.

## **5 Completion of the Tool Build Log Construction Point Sketch (Tool Build Logs CPS) (MAC1147CS)**

- 5.1 At the top of the MAC1147CS, print the complete tool number.

- 5.2 Enter the duplicate or unit number (Orig., Dup 2, Unit 0002 etc).
- 5.3 Draw a reasonable sketch of the construction points and record the actual readings. Affix the Acceptance Stamp adjacent to the actual readings on the sketch when points are recorded progressively.
- 5.4 Affix an Acceptance Stamp in the advance release (ADV) block if the information shown is to a percent release drawing or other advance release information. Explain the reason for the conditional acceptance. Affix an Acceptance Stamp in the FIRM block if the information shown it to a firm release drawing signifying unconditional acceptance.
- 5.5 Enter the date the dimensions were recorded.
- 5.6 When a Tool Build Logs CPS is prepared, it should be placed in the log immediately following the Tool Build Log Detail Accountability ( Tool Build Logs DA), MAC1147DA).
- 5.7 The Tool Build Logs CPS may be waived in lieu of the following:
  - 5.7.1 Record on a print-out the construction point locations in X, Y, & Z direction. Include tool number, dup or unit number, date, and acceptance stamp. Insert the print-out in the Tool Log in place of the Tool Build Logs CPS.
- 5.8 Steel stamp the locations in X, Y, & Z directions adjacent to the construction point in the tool base material or on an STD139XX-1 tag or equivalent construction point identification tag.
- 5.9 Steel Acceptance stamp next to the steel stamped locations.
- 5.10 Seal all movable details of the Construction Point with sealer.
- 5.11 Stamp sealing materials with Acceptance stamp before hardening.

## **6 Completion of the Tool Detail Information (MAC1147DB)**

- 6.1 At the top of the page, print complete tool number and the duplicate or unit number (Orig, Dup 2, Unit 0002, etc).
- 6.2 Enter the detail number and the sheet and zone number of the drawing where recorded information is found.
- 6.3 Copy all drawing dimensions with a +/- .015 tolerance or less that are used to set each detail in the block titled BLUEPRINT DIMENSION (Include nominal dimensions and tolerances).

- 6.4 Record the actual dimensions for each nominal dimension when the detail setting is accepted, in the block titled ACTUAL DIMENSION.
- 6.5 Enter the information that is essential to describe any special conditions encountered when the detail is accepted in the REMARKS section.
- 6.6 Place an Acceptance stamp in the advance block (ADV) if the detail is accepted to a percent release or a marked-up drawing. Also, enter a brief description of the conditional acceptance.
- 6.7 Place an Acceptance stamp in the FIRM block when a detail is accepted to a firm release drawing signifying unconditional acceptance.
- 6.8 Enter the date of the detail acceptance.
- 6.9 Enter the page number starting with #1. TDI sheets shall be kept in numerical order. When practical, the TDI sheet shall be completed on both sides before adding a new sheet.
- 6.10 When the last master coordinated detail for a tool is accepted, the master tool rigging dimensions shall be recorded in the next entry of the TDI.
- 6.11 In lieu of using the Tool Detail Information Sheet, a computer print-out may be used. The computer print-out shall include the information stated in paragraphs 6.1 through 6.11. The print-out shall be inserted and numbered in numerical page order along with any other Tool Detail Information Sheets.

## **7 Completion of the Tool Build Log Hole Pattern (MAC1147E)**

- 7.1 The MAC1147E, Tool Build Log Hole Pattern ( Tool Build Logs HP), is used to document the size of holes and their location as indicated on the Tool Design drawing.
- 7.2 Enter the complete tool number, duplicate or unit number (ORIG, Dup 2, Unit 0002, etc.) the detail number and the date inspected.
- 7.3 Enter the hole numbers and size as shown on the tool drawing when applicable.
- 7.4 Record the actual size of each hole listed on the Tool Build Logs HP.
- 7.5 Enter the X and Y coordinates locating each of the listed holes.
- 7.6 Record the actual measured dimensions for the X & Y coordinates.



- 7.7 Record all the nonconforming dimensions on a nonconformance document and enter the ND number on the same line as the nonconformance in the VERIFIED BY column.
- 7.8 Indicate the acceptance of the measured dimensions by placing an Acceptance stamp in the VERIFIED BY column.
- 7.9 In lieu of using the MAC1147E, computer print-outs may be used. The computer print-out shall include the information stated in paragraphs 7.2 through 7.8. The print-out shall be inserted and numbered in numerical page order along with any other Tool Build Log Hole Pattern.

## **8 Completion of Tool Build Documentation (Tool Build Logs D) (MAC1147D)**

- 8.1 The MAC1147D is only required when the blueprint requests documented dimensions.
- 8.2 Enter the complete tool number, the duplicate or unit number, and the date.
- 8.3 Enter the sheet and the zone of the blueprint where the documented dimensions are found.
- 8.4 Enter the blueprint documentation numbers in sequence.
- 8.5 Enter the blueprint documentation dimensions and tolerances.
- 8.6 Record the actual dimensions of the original tool or duplicate tool, as applicable.
- 8.7 Affix an Acceptance Stamp for all the in-tolerance firm dimensions in the FIRM column and enter the date.
- 8.8 If the firm dimensions are not acceptable:
  - 8.8.1 List the out-of-tolerance dimensions on a nonconformance document
  - 8.8.2 Record the nonconformance document number and the date in the REMARKS column of Tool Build Logs D.
- 8.9 Upon the acceptance of the reworked or TCO condition, enter the new date in the REMARKS column and affix an Acceptance stamp in the FIRM column.

## **9 Completion of Quality Calibration Log (MAC5420)**





- 9.1 Enter the tool number, duplicate number (ORIG, Dup 2, etc.), building, and date.
- 9.2 Check box to indicate system being used to work tool.
- 9.3 Enter the name and type of instrument used: 0-1 Mic, Cube, Tracker.
- 9.4 Enter Property Number and due date from Met Lab Cal sticker (or equivalent per Sellers documented process).
- 9.5 Enter acceptance stamp and date the equipment is used.
- 9.6 Scale to Tool –check yes or no. If yes is checked, skip to Remarks.
- 9.7 Enter property number of scale bar, due date, and length from Met Lab Cal sticker (or equivalent per Sellers documented process).
- 9.8 Check box to indicate scale bar material.
- 9.9 Enter brief description of calibration issues when they occur in Remarks area.
- 9.10 Enter Acceptance Stamp.

## 10 Completion of Laminate Tool Build Log (AM0044)

- 10.1 Enter the tool name, number, and dup or unit number.
- 10.2 Enter the reference tool name and number (MAM, SP, TMF, etc.).
- 10.3 Enter the TCO and/or Rev. letter per the Tool Order.
- 10.4 Enter the detail or piece number.
- 10.5 In the Lay-up section, enter the lay-up type (overlay, underlay, facility etc.). Under Lay-up Start, enter the date, time and Acceptance stamp when the lay-up is started. Under Lay-up Comp, enter the date, time, and Acceptance Stamp when the lay-up is completed. Under Lay-up Pull, enter the date, time, and Acceptance stamp when lay-up is pulled.
- 10.6 In the Shore Hardness section, enter the nominal hardness for material being used; the actual shore hardness at time of lay-up pull, Acceptance stamp, and the date.

**Note:** Shore hardness for laminate materials can be found in the Qualified Tooling Materials Manual.



- 10.7 In the Waxup section, enter the nominal wax up per Tool Order, Sequence Planning Sheet, or Engineering Blueprint, the actual wax thickness incorporated, the acceptance, the Acceptance stamp, and the date.
- 10.8 In the M/L pull section, enter the nominal condition of Mold line Gap per Tool Order, TFIM/TPIM, and Sequence Planning. Ref (net +/- .005, +/- .010), the actual condition at time of lay-up pulls, the Acceptance stamp, and the date.
- 10.9 In the TSL/EOP lines section, enter the type of Theoretical Splice Line/End of Part Lines (TSL/EOP), number of places lines were transferred from Reference Tool, the Acceptance stamp of operator, and the date.
- 10.10 In the Pin Coord section, enter the size and quantity of pins incorporated in the lay-up, the Acceptance stamp and date.
- 10.11 In the Trim section, enter the nominal dimension plus the tolerance (+/- .010 +/- .005 etc.) the actual location, the Acceptance stamp and the date.
- 10.12 In the Locators section, enter the nominal location (Net to EOP, dim from EOP, etc.), the actual location, the Acceptance stamp and the date.
- 10.13 In the comments section, enter any information that is pertinent to the Fabrication/ Inspection of the tool not listed in the previous sections.
- 10.14 Attach print-outs for C/Ball locations when required.
- 10.15 Forward the Laminate Tool Build Log with the completed laminate detail to Boeing.