Quality Assurance Manual

December 14, 2016
Revision Level A

Pillar Machine
5000 South 1810 West
Taylorsville, UT
84129

Document Revision History

Revision Level	Revision Date	Initials	Description of Changes (specify changed pages)
A	12/14/16	JP	Initial Release

Table of Contents

Quality Assurance

Our inspection system procedures assure conformance to contract requirements.

The provisions incorporated hereafter are in accordance with MIL-I-45208A.

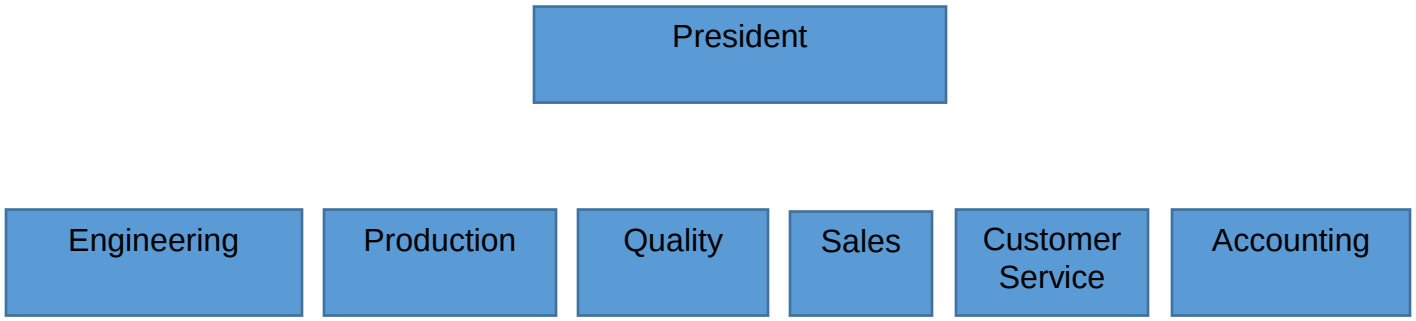
Unless otherwise requested, the order of precedence for contract requirements shall be:

1) Purchase Order

2) Drawings

3) Supporting Specifications

This shall apply to all orders requiring the application of MIL-I-45208A.



Pillar Machine
General Organization Chart
December 22, 2016

Authority of Quality Control

Any Pillar Machine Employee has the authority to place stop orders on production where deviations from quality control standards have occurred. At this time the quality control manager and production manager will make necessary corrections.

Revisions

All requests for revisions to our quality control standards will be reviewed by Quality Control for applicability and adherence to appropriate specifications.

Revisions will be documented, appended and initialed by Quality Control.

A complete review of our quality control system will be conducted annually to assure compliance with applicable specifications and any changes noted under the revision control appendices.

Manufacturing Operations

The purpose of this document is to identify work in process, sequence of operations, operator, inspection documentation and special instructions.

One Manufacturing Operations Form is issued for each production lot.
The individual operator and/or inspector is responsible for the entries required for each operation.

Each operation will be subject to a First Article inspection and in-process inspections as deemed necessary. The product will be subjected to a Final inspection and documented on the Manufacturing Operations Form (see Sample Plan for quantity.)

The completed Manufacturing Operations Form is maintained in the customer file with the drawing, certifications, specifications and other pertinent data.

Manufacturing Operations Form

Manufacturing Operations Form

CUSTOMER: _____ JOB #: _____

PART #: _____ REVISION: _____ QTY: _____

DESCRIPTION: _____

OP #	Item #	Description	Work Center	Machinist	Drawing Location	Out	In

Document Change Control

Drawings and specifications are filed by customer name.

Engineering shall be responsible for assuring that the correct drawings and specifications of the required revision accompany the released Manufacturing Operations Form and are made available for use by production and inspection. Engineering shall be responsible for making changes received from the customer and assure the obsolete drawings/specifications are removed and clearly identified as obsolete.

When a change is put into effect the Manufacturing Operations Form must be revised, dated and initialed and the product in process must be reviewed to determine the effectivity of potential rework or separation. Special instructions on the Manufacturing Operations Form shall denote proper action.

All drawings, specifications, Manufacturing Operations Forms, certifications and other pertinent data shall be returned to the customer file folder upon completion of the finished product.

Corrective Action

This procedure details the method of securing corrective action to prevent a repeated discrepancy/rejection. There are two types of action required.

IN-HOUSE CORRECTIVE ACTION:
Discrepancies caused internally, parts having been rejected by inspection or returned from the customer.

VENDOR CORRECTIVE ACTION:
Discrepancies of material, parts or processes as received from a vendor.

IN HOUSE C.A.R.: When a rejection occurs during the in-house operations or hardware is returned from the customer as rejected, the IN-HOUSE C.A.R. form will be completed and filed in the customer file folder or attached to the Manufacturing Operations Form in process.

VENDOR C.A.R.: When material, parts or processes are rejected at receiving inspection, a duplicate VENDOR C.A.R. form will be initialed, original to vendor, duplicate to follow-up. Upon receipt of acceptable VENDOR C.A.R., the duplicate will be pulled and filed in the vendor file.

In-House Corrective Action Request

In-House Corrective Action Request

Customer:_____ Date:_____

Part Name_____ Quantity_____

Part Number_____ Rev_____ P.O. #_____

Criteria	Actual	Inspector

Material Disposition Action

Use as is ____ Rework ____ Repair ____ Scrap____

Instructions_____
_____

Cause_____
_____

Corrective Action_____

Re-Inspection By_____ Date_____

Attach completed form to Manufacturing Operations Form or customer file folder.

Vendor Corrective Action Request

Vendor Corrective Action Request

Pillar Machine
5000 South 1810 West
Taylorsville, Utah 84129
Tel: 801-965-1900

Date:_____

To:

Vendor Name
Address
Attention:
Reference P.O. #

The following discrepancies have been documented against (**Name of component(s**)) by our receiving inspection department and require corrective action.

Signed_____

***Action taken to prevent recurrence:**

_____
_____
_____
_____

By_____ Position_____ Date:_____

*Please provide your corrective action and return form to Jack Parker at Pillar Machine within 15 days.

_____

Material Storage

All material shall be clearly identified upon receipt with the following information:

- Date Received
- Customer Name
- Customer Part Number
- Customer P/O #
- Material Description

All material shall be stored in a controlled manner and in bins or racks to prevent damage.

When a partial quantity is released it will be accompanied with a Manufacturing Operations Form and the remaining material shall maintain proper identification. Periodic surveillance of the material storage shall be performed by the inspection personnel assigned. Any discrepancy will be reported to the area supervisor for necessary corrections.

Non-Conforming Material

The Quality department shall be responsible for identifying any and all discrepant material and shall separate discrepancies from the conforming parts.

Identification of discrepant material shall be positive and clearly shall indicate the rejection cause. Non-conforming Material shall be segregated in a separate "Hold Area" until disposition by M.R.B.

Disposition of non-conforming material shall be made by authorized personnel only. Only inspection personnel may release material after satisfactory corrective action has been taken.

Receiving Inspection

All sub-contracted parts, material or processes shall be subjected to a receiving inspection.

A receiving inspection log shall be maintained to record the activity and actions by receiving inspection.

The following steps are to be adhered to in performing receiving inspection.

1) Obtain copy of P.O., drawings and/or specifications.

2) Log date and Purchase Order Number.

3) Inspect material for certifications.

4) Inspect material for quantity and any physical damage.

5) Inspect material for criteria (dimension, processes, etc.)

6) Log accepted or rejected.

7) Identify material (see material storage or issue C.A.R.).

8) Store material, file certifications in customer file.

The quantity of parts to be inspected will be consistent with the sampling instructions of this manual.

Receiving Inspection Log

Receiving Inspection Log

Date	P/O	Part	Qty	Certifications	Damage	Accept	Reject	Inspector

Comments:_____
_____
_____
_____
_____
_____

Inspector: _____

First Article Inspection

A first article inspection shall be performed on all quality program production orders. The first article shall be noted on the Manufacturing Operations Form.

The first article shall be recorded on a First Article Inspection Form, to be maintained by Quality Control. All records are to be kept on file in the Quality control area.

The first article must be acceptable prior to the release for production to be run for that operation. This may consist of one or more characteristics as noted on the Manufacturing Operations Form and includes all operations up to the prior inspection.

Correction of operations to produce an acceptable first article do not require a formal corrective action.

First Article Inspection Form

Pillar Machine	**Date:**
First Article Inspection	
Characteristic Accountability, Verification and Compatibility Evaluation	**Sheet 1 of**

Part Number		Part Name		Serial Number		FAI Report
Characteristic Accountability		Inspection / Test Results				
Char No.	Reference Location	Characteristic Designator	Requirement	Results	Measurement Equipment	Non Conformance Number
The Signature indicates that all characteristics are accounted for; meet drawing requirements or are properly documented for disposition.						
Prepared By					Date	

In-Process Inspection

If the production run consists of more than 10 parts, an in-process inspection will be performed at a rate designated by Quality Control. The inspection will be based on the complexity and tolerance of the part.

This inspection shall be noted on an Inspection Form and also referenced on the Manufacturing Operations Form. All in-process inspections will be so noted. The information required is as follows:

- Criteria
- Piece Number
- Accept or Reject
- Date
- Inspector

The inspected parts will be identified as acceptable or unacceptable so that no co-mingle will occur in the production run.

If a reject is found during an in-process inspection, the lot will be 100% inspected for that criteria and the parts rejected will be segregated and identified as non-conforming material.

This must be so noted on the Inspection Form and the foreman notified immediately.

Final Inspection

A final inspection shall be performed on all completed parts using a sampling plan based on MIL-STD-105.

All rejected parts will be segregated and identified for proper action by authorized personnel.

A note on the Manufacturing Operations Form shall indicate final inspection performed, quantity accepted and shall be dated and initialed by the performing inspector.

Final inspection includes verification of all requirements on the Purchase Order, drawings and applicable specifications.

Inspection Form

Inspection Form

INSPECTION #: _____ DATE: _____

INSPECTION TYPE: _____

CUSTOMER: _____ JOB # _____

PART # _____ ITEM # _____

OPERATION # _____

PIECE #	CRITERIA	SPECIFICATION	TOL	ACTUAL	ACC/REJ	INSPECTOR

LIST INSPECTION TOOLS USED _____

_____

LIST SPECIFICATIONS USED _____

_____

Inspection Equipment Calibration

All inspection measuring devices and control instruments shall be calibrated at regular intervals sufficient to assure the required accuracy at all times.

A card file will be maintained by Quality Control to record a calibration record for each device.

Each device will be identified with a numbered sticker to relate to the calibration card of the particular instrument/device.

Master equipment shall be calibrated by sources capable of traceability to the National Bureau of Standards.

The Calibration System shall be in accordance with MIL-C-45662A.

Inspection Equipment Calibration Record

Inspection Equipment Calibration Record

Tool Identification Number:

Tool Description:

Tool Manufacturer:

Frequency of Calibration:

Calibration Date	Adjustment	By	Remarks

Inspection Equipment Calibration Frequency

NOTE: These designated frequencies are used as the starting frequency and may be revised as dictated by the frequency of adjustment/repair required. (See individual calibration cards.) In no case will 12 months be exceeded.

Measuring Tool	Frequency of Calibration
Micrometers (all types)	6 months
Dial/Vernier Calipers	6 months
Thread Plug Gages	6 months or number of passes
Thread Ring Gages	6 months or number of passes
Dial Indicators	6 months
Plain Plug Gages	12 months
Precision Pin Gages	12 months
Drill Blanks	12 months
Precision Height Gages	6 months
Electronic Height Gages	6 months
Gage Blocks	12 months
Surface Plates	12 months
End Standards	12 months
Optical Comparators	12 months
Protractors	12 months
Vee Blocks	12 months
Parallels	12 months
Angle Plates	12 months
Precision Squares	12 months
Sine Bars	12 months

Thread Gages

Thread Gages

Allowable passes per .0001" of Gage Wear into Steel

Size	Passes	Size	Passes	Size	Passes
0-80	1000	7/16 - 14	730	1 1/8 – 18	500
1-72	1000	7/16 – 20	730	1 ¼ - 16	470
2-56	1000	7/16 – 24	730	1 ¼ - 20	470
4-40	1000	½ - 13	700	1 5/16 - 12	450
4-48	1000	½ - 20	700	1 5/16 – 32	450
5-40	1000	½ - 28	700	1 3/8 – 18	440
6-32	1000	9/16 -18	660	1 ½ -18	420
6-40	1000	9/16 – 20	660	1 ½ - 12	420
8-32	950	5/8 – 18	620	1 ½ -16	420
8-36	950	5/8 – 24	620	1 5/8 – 12	400
10-24	950	11/16 – 24	600	1 5/8 -16	400
10-32	950	¾ - 16	580	1 3/4 – 16	380
¼ -20	875	¾ - 18	580	1 7/8 – 12	370
¼ -28	875	13/16 – 20	565	1 15/16 - 16	350
¼ -32	875	7/8 – 14	550	12 ¼ - 16	320
5/16 -18	825	7/8 – 16	550	2 ½ - 12	300
5/16 - 24	825	7/8 – 18	550	2 ½ - 16	300
5/16 –32	770	7/8 – 20	550	2 5/8 – 16	280
3/8 –16	770	1 – 14	525	2 ¾ - 12	280
3/8 – 24	770	1 1/16 – 18	515	2 7/7 – 16	280
3/8-32	770	1 1/8 - 12	500	All over use	250

Sampling Plan

This sampling plan is applicable to receiving inspection, in-process inspection and final inspection.

The chart, as follows, is based upon normal operations assuming the equipment is capable of holding the required tolerances. In the event, there are other circumstances such as tight tolerances, difficult material or operations that are historically difficult to produce, the inspector will initiate a tighter inspection plan as required. The customer may establish the sampling plan as per purchase order and specification requirements.

If a tightened sample plan is determined necessary, this shall be noted on the reverse side of the Manufacturing Operations Form.

Sample Plan Table

Sample Plan Table

Number of Parts	Number of Parts Inspected	Allowed Number Defective
2 – 9	All	0
9 – 90	8	0
91 – 280	32	1
281 – 500	50	2
501 - 1200	80	3