


# Starr Machine, Inc.

## Quality Manual

### INDEX & TABLE OF CONTENTS

| <u>Subject</u>                           | <u>Section</u> |
|--|----------------|
| Introduction                             | 1              |
| Administrative                           | 2              |
| Drawing Changes and Control              | 3              |
| Inspection and Testing                   | 4              |
| Qualifying Subcontractors                | 5              |
| Receiving Control                        | 6              |
| Inspection, Measuring and Test Equipment | 7              |
| Control of Nonconforming Material        | 8              |
| Final Inspection                         | 9              |
| Product Identification and Traceability  | 10             |

  
Management

  
QA

## **1: INTRODUCTION**

It is the commitment of the management team of Starr Machine Inc. that the guidelines and procedures in this manual are followed to insure that all parts produced not only meet our customer's specifications, but are of the highest possible quality.

This manual is to be followed by all employees to assure that we provide a quality part that meets or exceeds all of our customer's needs. .

## **2: ADMINISTRATIVE**

The following is Starr Machine's organizational chart. Every job is taken through completion by the team consisting of the machinist, inspector, foreman, plant manager and quality control manager. The Quality Assurance Manager is responsible for the total quality system. The duties are as follows:

- Quality Control Assurance Engineering and Planning
- Vendor Quality Control
- Receiving Inspection
- In-process Control
- Final Inspection and Test
- Special Process Inspection
- Tool and Gage Inspection
- Quality Assurance Review
- Data Collection and Quality

## **3: DRAWING CHANGES AND CONTROL**

When a purchase order or contract is received at Starr Machine, it is entered into our order database. This system will generate a "Green" router. All Revision levels will be on all "Green" routers, if given on the purchase order or supplied print. If not given, the (-) will be used. It is then assigned a job number. The job number is written on all documents (purchase orders, drawings and routers, etc) pertaining to a particular job. These documents are then forwarded to the foreman who then reviews these documents to insure that all requirements can be met. When the order is ready to be produced, the drawings, green routers are given to the machinist. New drawings and/or purchase order revisions are handled in the same manner as noted above when the order is in process. The foreman will review the revised documents to insure that all requirements can be met. The old print is removed from the floor, marked "FINISHED" and filed. This print cannot be used again because of the "FINISHED" on it. If necessary, the material will be inspected. If there are any further problems due to engineering revisions, the customer will be notified immediately.

## **4: INSPECTION AND TESTING**

### **4.1 In-process And Final Inspection**

All dimensions shall be transferred to an “In-process Inspection Sheet”. This sheet will be created by a person from the QA department and will include the required method(s) of checking and the required inspection frequency. The machinist is required to check his first part, then, he is to have the QA department check the same part before proceeding to run the remaining parts. After the first part is approved by QA, the machinist is to check all of the parts by himself. All the required data will be recorded on the “In-process Inspection Sheet”. When the job is finished, the QA department will be given one day to do a final inspection before the parts are shipped. The job is not considered finished until the final inspection is done by QA.

### **4.2 In-process Control**

The parts are moved, by job number, ensuring that all operations are done at a particular station. A green router is written for a part stating the procedure used to run the part through the plant as to machine sequence and inspection sequence. A copy is kept with the drawing master file.

One hundred percent piece inspection is done on every piece. The Quality Control System provides for the first piece inspection on newly set up operations to assure conformity to blueprint requirements. The machine operator submits the first piece produced from his machine to the floor inspector for inspection approval. Adjustments in the set up are made and sample pieces are submitted until an acceptable part is produced. First piece inspection may be repeated whenever an operator is changed and/or tools are sharpened. When first piece is accepted, the inspector will sign off on the “Green” router. If any nonconforming parts are produced, the Nonconforming Procedure must be followed. All acceptable parts are serialized.

As an added assurance for the uniformity of the production, Periodic Audit Inspection is also provided. Serializing all inspected parts indicated on record of inspection. The quality control department, on its final inspection report maintains record of such inspection. If material is found to be discrepant, the procedure for non-conformity will be followed.

All detailed parts, sub-assemblies and assemblies used on production contracts are subject to a final inspection to insure that all items are processed to applicable engineering drawings and/or specifications making certain that all operations have been correctly performed and completed. An inspection checklist is prepared as an aid.

## **5: QUALIFYING SUB-CONTRACTORS**

The General Manager will perform the selection of sub-contractors with the assistance from the Manufacturing Engineer. A survey questionnaire will be used. Only qualified vendors will be used.

## **6: RECEIVING CONTROL**

All materials received will require either a certificate of compliance from the supplier, or will need to be inspected by the QA department. Bar or raw material must be clearly marked at the time of receiving. All heat-treated parts must be Rockwell checked before going to the grinders.

Ferrous or non-ferrous material, plate, brass, etc. will be counted and checked for size and that the appropriate certifications are included. The material will then be painted to Starr Machine's color code and label with the alloy type before storage.

Castings of any kind will be counted and the revision number and the appropriate certification verified. The material will then be labeled or marked with a Starr Machine job number. This number will stay with the material until the job is completed.

Certifications are kept on file and marked with the appropriate job number. The General manager is responsible for the maintenance of the file that contains the material certifications and certificates of compliance.

Defective material is tagged with a reject label and returned to vendor for replacement.

## **7: INSPECTION, MEASURING AND TEST EQUIPMENT**

Company policy required that inspection, measuring and testing equipment is controlled, calibrated and maintained to demonstrate the conformance of the product to required specifications. Inspection, measuring and test equipment is calibrated with a valid relationship to National Institute of Standards and Technology (NIST). Inspection, measuring and test equipment is used in a manner that measurement uncertainty is known and is consistent with the required measurement capability. Calibration records are maintained and the status of calibration, inspection, measuring and test equipment is identified by Quality Assurance. Quality Assurance will use only inspection, measuring and test equipment that has been properly calibrated within the time frequency established by the Quality Assurance Manual.

Measurement Identification, Product measurements and the required tolerances are identified on documents by the customer's drawings and/or the engineering Department, as appropriate. Selection and verification of the inspection measuring and test equipment for the required accuracy and precision to perform those measurements is the responsibility of Quality Assurance.

Calibration and Maintenance of inspection measuring and test equipment used to judge the quality of the product is identified and calibrated to a traceable nationally recognized standard such as those at the National Institute of Standards and Technology (NIST). When no such standard exists, an appropriate alternate basis of calibration is selected and documented. The calibration status of inspection, measuring and test equipment is identified with a suitable indicator or approved identification record.

### **Tools and Gage Control**

Identification and calibration of measuring tools and gages are carried out in accordance with MIL\_STD 45662. All master equipment is calibrated every five years and is used only for recalibration of our inspection tooling. All inspection grade tooling is serialized.

Calibration records of the inspection, measuring, and test equipment are maintained by the QA department.

Note: all equipment or gages that cannot be calibrated in-house will be sent out to a qualified outside lab for calibration.

Documents are filed for each piece of equipment stating:

- \*Serial Number
- \*Equipment Name
- \*Manufacturer Name
- \*Calibration Schedule
- \*Last Date of Recalibration

All inspection tooling is calibrated annually. When a critical dimension is to be checked, the particular measuring instrument is calibrated before use. All bores are measured with dial bore gages on .002 tolerances or less with a .0001 indicator for final inspection, bore gages and bore micrometers will set before use on the shop floor. The surface plates are checked every year and its condition is determined. If it is not within Grade A specification, it is lapped in by a qualified technician and certified.

If any significant out of tolerance conditions on measurement and test equipment appears, test equipment users or contractors will be notified of the condition that exists so that appropriate action can be taken to correct possible nonconforming products. All involved parts shall be 100% inspected again.

The inspection, measuring, and test equipment is handled, preserved, and/or stored to maintain accuracy.

All adjustments accessible to the user that could affect the formal calibrations are protected by a tamper-proof seal or a work instruction when a seal is not practical.

## **8: CONTROL OF NONCOMFORMING PRODUCT**

Company policy requires that non-conforming product is identified, documented, evaluated and prevented from being used or shipped. Responsibility for disposition of nonconforming product is identified and, when required the customer is contacted for deviation. Repaired or reworked product is re-inspected.

### **Nonconforming Returns From The Customer**

If there is a part returned to us for repair of a nonconforming dimension that part will go through a 100% final inspection on **all dimension** before shipping back to the customer

### **In-Process Nonconforming Parts**

If any part is found to be nonconforming while in process, the following procedures shall be followed:

- The machine operator is to contact the Quality Assurance Manager, Production Manager and the Engineering Manager immediately upon discovering the nonconformity.
- The Quality Assurance Manager shall contact the customer to discuss a possibility of a deviation
- After a decision is made, the non-conforming part is to be painted and tagged as instructed by the Quality Assurance Manager
- The nonconforming/deviated part shall remain with the remainder of the order until the order reaches final inspection.
- The nonconforming parts shall be disposed of or deviated in Final inspection.

### **Nonconforming Material**

If any material is found to be out of specification in the inspection process, it is marked accordingly. If the material in question is purchased, it is either sent back to the supplier or sent out as scrap. Machined parts that are not within customer specifications are marked with red layout dye and a nonconforming report and set aside.

The information on the non-conforming report includes:

- \*Job Number
- \*Date
- \*Description of Defect
- \*Method of Repair

The Quality Assurance Manager then reviews the non-conforming report and consults a Manufacturing Engineer for disposition of the part.

The Quality Control Department inspects products to assure all products meet the customer's specifications. If a product is found to be out of specification, therefore defective, a Non-Conforming Report will be attached to the product.

The inspector will immediately show the Quality Control Manager the inspection report and the product.

The General Manager will determine if the product is scrap or if the customer should be contacted for repair instructions.

If a part is scrap, it is tagged as well as marked. If it is a purchased part, it is returned to the vendor or disposed of in the proper manner.

If the discrepancy is such that the customer is contacted, they make the final decision (to scrap or repair) then the parts are either returned to the lot or eliminated.

The disposition decision will be one of the following options:

- Return to vendor
- Re-work
- Repair
- Customer Accepted Deviation
- Scrap

## **9: CORRECTIVE ACTIONS**

Causes and potential causes of non-conformities are investigated. Corrective and preventive actions are initiated to prevent occurrence and/or recurrence. Controls are applied to ensure that corrective and preventive actions are implemented and that they are effective.

## **10: FINAL INSPECTION**

When the lot is completed, a final inspection takes place. Prior to packaging, all parts are checked one hundred percent visually to ensure that no operation has been missed. Close tolerance machined dimensions are checked 100% on lots up to 20 pieces, then 50% to 10% depending on lot size. It is the responsibility of the final inspector to inspect all items to applicable engineering drawings and/or specifications making certain that all operations have been correctly performed and completed. Inspection checklists may be prepared as aids. Inspection reports must be filed and retained for ten years. These reports must include the following:

- \* Date of Inspection
- \* Part Number
- \* Job Number

Parts are also checked for proper deburring as well as for nicks etc. that have occurred during the machining operations. If any material is found to be discrepant, the procedure for non-conformity will be followed. If and when part traceability is required,

the Green router will note it in the Special Operation block. The inspector will stamp all parts with the job number.

## **11: PRODUCT IDENTIFICATION AND TRACEABILITY**

Company policy requires that materials, components, subassemblies, and customer products are identified by a part number and job number correlated to corresponding drawings, order database, and other technical documents.

All purchased and in-house manufactured materials and parts are identified with customer's part numbers traceable by job number. The part numbers provide for a correlation between a customer's part and its technical documentation. The job number provides for a correlation from receipt and during all stages of production through shipment of a production lot.

### **Bar Stock Identification**

Bar stock will be given a stock code for job number trace ability and color code for identification while in bar stock inventory. Once material is cut and staged for production all blanks will be marked with the job number.