STANDARD OPERATING PROCEDURE

Manufacturing Quality Inspection SOP

Document no.	SOP-MFG-001
Revision	1.0
Owner	Quality Manager
Effective date	September 15, 2026
Review cycle	Every 12 months

1. Purpose

To make sure production parts are measured against specification at the right frequency and stage, out-of-spec conditions are caught early, and only conforming product is released to the next process or customer.

2. Scope

Applies to first article, in-process and final inspection of manufactured parts on the production floor. Disposition of confirmed nonconforming product is covered by a separate SOP.

Definitions

First article inspection	The inspection of the first part produced after a job start or changeover, before the rest of the run continues.
AQL	Acceptable quality level. The sampling plan used to decide how many parts to check based on lot size and quality history.
Control plan	The document listing which characteristics of a part must be inspected, at what frequency, and with what method.
Gauge R&R	A study that checks whether a measurement system gives consistent, repeatable results across operators and gauges.

3. Responsibilities

Quality Inspector	Performs sampling and measurement per the control plan, records results, and flags out-of-spec conditions.
Production Operator	Runs in-process checks between inspector visits and stops the line if parts are clearly out of spec.
Quality Manager	Owns the control plan and sampling plans, reviews trends, and manages the calibration and gauge R&R program.
Production Supervisor	Coordinates line stoppages for quality issues and confirms corrective actions are followed on the floor.

RACI matrix

Activity	Quality Inspector	Production Operator	Quality Manager	Production Supervisor
Maintain the control plan and sampling frequency	C	I	R/A	I

Activity	Quality Inspector	Production Operator	Quality Manager	Production Supervisor
Perform first article inspection	R/A	C	I	I
Perform in-process inspections	R/A	R	I	I
Quarantine and tag out-of-spec parts	R/A	R	I	C
Release the lot for shipment or next process	R	I	A	I

R = Responsible, A = Accountable, C = Consulted, I = Informed

4. Materials and PPE

Materials, tools and systems

- Control plan and inspection specification for the part
- Calibrated measurement tools (calipers, gauges, torque testers)
- Statistical process control (SPC) record or software
- AQL sampling plan tables
- Quarantine tags and hold area
- First article inspection form

Personal protective equipment

- Safety glasses
- Gloves appropriate to the part material
- Hearing protection near running equipment

5. Procedure

Step	Task	Owner	Done
5.1	**Review the control plan for the part** Inspector reviews the control plan for the part number running, confirming which characteristics to check, the method, and the required sampling frequency.	Quality Inspector	☐
5.2	**Verify measurement equipment** Inspector confirms the gauges and tools needed are within their current calibration date before taking any measurement. **Checkpoint:** All measurement tools used are within their current calibration date.	Quality Inspector	☐
5.3	**Perform first article inspection** At job start or after a changeover, inspector measures the first part produced against every characteristic on the control plan before the operator continues the run. **Checkpoint:** First article passes every control plan characteristic before the run continues past the first part.	Quality Inspector	☐
5.4	**Pull the sample per the sampling plan** Inspector pulls parts from the run at the interval specified in the AQL sampling plan for the current lot size.	Quality Inspector	☐

Step	Task	Owner	Done
5.5	**Perform in-process inspections** Inspector measures the sampled parts against specification at the defined interval throughout the run, and the operator performs any assigned in-process self-checks between inspector visits.	Production Operator	☐
5.6	**Record measurements on the SPC record** Inspector records every measurement on the SPC record or inspection log, not just a pass or fail result, so trends can be tracked over time.	Quality Inspector	☐
5.7	**Compare results to specification limits** Inspector compares each result to the specification limits and control limits on the SPC chart, watching for trends approaching the limit even if individual parts still pass.	Quality Inspector	☐
5.8	**Quarantine and tag nonconforming parts** When a part fails inspection, the inspector stops the affected process, tags the suspect parts, and moves them to the quarantine area for disposition under the nonconforming product procedure. **Warning:** Do not allow suspect parts to continue to the next process or be mixed with conforming stock.	Quality Inspector	☐
5.9	**Notify the supervisor of an out-of-spec trend** Inspector notifies the production supervisor immediately when a trend or failure indicates a process issue, so the line can be paused if needed.	Production Supervisor	☐
5.10	**Perform final inspection before packaging** Inspector performs a final inspection on the completed lot against the control plan before it is packaged or moved to the next process.	Quality Inspector	☐
5.11	**Complete records and release the lot** Inspector completes the lot's inspection records and the quality manager reviews and releases the lot for shipment or the next process step.	Quality Manager	☐
5.12	**Participate in gauge R&R and calibration audits** Quality manager schedules periodic gauge R&R studies and calibration audits for the measurement tools used in inspection, and inspectors participate as scheduled.	Quality Manager	☐

6. Quality checks

- First article inspection is completed and passed before any run continues past the first part.
- Every measurement tool used is within its current calibration date.
- Sampling frequency on the floor matches the control plan for each part number.
- SPC records show individual measurements, not only pass/fail results.

7. Records

- SPC records and inspection logs
- First article inspection forms
- Calibration and gauge R&R records
- Quarantine and hold tags

8. KPIs

- First-pass yield
- Defects found per lot inspected
- Percentage of inspections completed at the required sampling frequency

- Calibration compliance rate

9. Common mistakes

- Skipping first article inspection to save time after a fast changeover.
- Recording only pass or fail instead of the actual measurement, hiding trends.
- Continuing to run parts after a failed sample while waiting for a decision.
- Using a gauge that is past its calibration due date.
- Mixing quarantined parts back into conforming stock before disposition.

10. Revision history

Revision	Date	Description	Reviewed by
1.0	September 15, 2026	Initial release	Ilia Pirozhenko

Approval

Prepared by	Approved by	Date

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