

 Precision Swiss Products, Inc.	Document # SOP-3.2-003	Revision 1
Document Title Choosing In-process Inspection (SPC)	Effective Date 11/16/23	
	Document Type Standard Operating Procedure	

1. Purpose:

To standardize how and when in-process inspection dimensions are chosen, and which tools will be used to inspect those dimensions. This will ensure programing and quality will always align and agree upon IP given to the production floor.

2. Scope:

This procedure is to be used during the following processes:

- a. Kick-off
- b. Programming of the part
- c. QC IP dimensions and documentation review

3. Terms, Acronyms and Definitions:

- a. **IP:** Inspection Plan, referring to In-Process Inspection (SPC)
- b. **SPC:** Statistical process control (SPC) is a method of quality control which employs statistical methods to monitor and control a process. This helps to ensure that the process operates efficiently, producing more specification-conforming products with less waste (rework or scrap).
- c. **QC:** Quality Control is a department that ensures the product quality is maintained or improved.
- d. **CMM:** Coordinate Measuring Machine is a device that measures the geometry of physical objects by sensing discrete points on the surface of the object with a probe.
- e. **SOP:** Standard Operating Procedure is a document with step-by-step instructions that tell you how to perform a process.
- f. **FAI:** A First Article Inspection (FAI) is a design verification process for verifying that a new or modified production process produces conforming parts that meet the manufacturing specification detailed in technical or engineering drawings. Typically, a supplier performs the FAI and the purchaser reviews the report.
- g. **Inspection Tool:** Tools that are determined to be appropriate for measuring the conformity of the part. These are determined by the programmers and are assigned on the SPC sheet.
- h. **Kickoff:** The meeting held to determine any risks and needs associated with production of the part.

4. References:

- a. SOP-3.2-001 (Standard Inspection Methods)

5. Responsibilities and Authority:

- a. Manufacturing Programmer- including programmers for Swiss, Lathe, and Milling departments.
- b. Sr. Quality Inspector/QC manager- A senior quality inspector/quality manager will work with programmers to decide on IP dimensions.
- c. CMM Programmer- A CMM programmer/Sr. quality inspector/quality manager will work with programmers to decide on IP dimensions.

6. Inputs:

- a. Customer drawing and inspection requirements

7. Choosing In-Process Inspection (SPC)

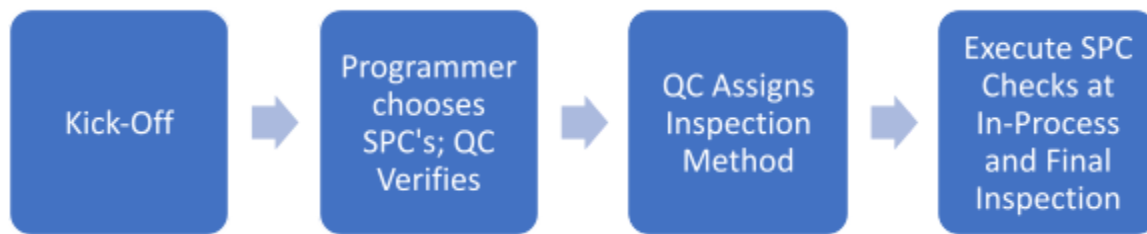
- a. Inspection Tools for FAI & In-Process Inspection (SPC) will be chosen during the kickoff meeting based on dimensions on the drawing by QC manager, Sr inspector, or QC programmer.
 - IP inspection equipment:
 - i. Should be determined based on criticality of the part, and the dimension being inspected.
 - ii. Hard checks will be performed based on criticality of the part, and the dimension being inspected, when applicable. Otherwise, use a CMM.
 - iii. Whatever is going to be inspected at a QC step later during production, must be on the in-process inspection sheet and must be inspected using the same inspection methods.
- b. In-process inspection dimensions (SPC) will be determined by the Manufacturing programmer. The programmer will circle dimensions on the drawing based on the following criteria:
 - i. Customer critical features
 - ii. Threads (gage)
 - iii. Diameter of threads (major, pitch, minor) if called out on drawing
 - iv. Surface finish callouts: 32 and lower (If applicable)
 - v. Any tolerance of $\leq \pm .002$ "
 - vi. Any OD Diameter checked using a micrometer with a tolerance of $\leq \pm .0005$ " must be checked using a mic stand for stability and repeatability.
 - vii. Any notes/callouts of "DO NOT BREAK THROUGH"
- 1. Whatever is going to be inspected at a QC step later during production, must be on the in-process inspection sheet and must be inspected using the same inspection methods
- 2. If a tool does multiple dimensions, inspecting at least one of them is enough to determine that the rest of them will be in tolerance.
 - i. The IP chosen will be verified by: QC manager/ Sr. QC inspector/ QC programmer.

8. In-process and Final Dimensions

- a. How to determine which dimensions will be inspected at final inspection:
 - i. PSP customer Inspection plan (if one has been created)
 - ii. $\leq$ IP dimensions chosen

9. Outputs:

All IPs will be thoroughly chosen using the steps outlined in this SOP. All machinists and inspectors should be able to inspect every part using the same methodology and equipment, outside of that defined on any inspection plan.

10. Flow Chart:**11. Quality Records:**

Record Name	Owner	Location	Record Media
SPC Sheet	Programming	O: Drive	Electronic

Revision History			
Revision	Description of Change	Approver	Effective Date
1	Initial Release	Daniela Kozar	11/16/23

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