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# IN-PROCESS INSPECTIONS

Operational Procedure: QOP-10-02

Rev.: A

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## I PURPOSE

The purpose of this procedure is to provide for a system and instructions, and to assign responsibilities for performing and recording in-process product verification, and in particular:

- Job set-up verification,
- Process performance monitoring,
- Visual inspections (appearance items), and
- In-process inspections.

## II APPLICATION

This procedure applies to materials, components, and subassemblies in the course of processing, manufacturing, and assembly.

This procedure directly concerns the Production and Quality Control departments.

## III PROCEDURE

### 1. General

- 1.1 The program of in-process product verification consists of verification of job set-ups (first article inspection), statistical process control, visual inspections and, when necessary, in-process inspections. The program is defined and documented in the Production Control Plan.
- 1.2 It is the policy of <COMPANY X> Inc. to concentrate resources and attention on defect prevention, rather than defect detection. The verification effort is focused on control of processes. Normally, in-process inspections are carried out for the purpose of collecting

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data for process performance monitoring (control charts). In-process inspections for the purpose of detecting and segregating nonconforming product are only specified when processes are not capable and/or are not sufficiently stable.

### 2. Job Set-Up Verification

- 2.1 Whenever processing equipment or machines are reset for any reason (for example, maintenance, repair, product change, etc.) and are then set up again for production, the set-up is verified before the production is resumed. To verify the set-up, a number of parts are produced and measured, and the results are plotted on a control chart. The number of parts required is of a subgroup size used for SPC.
- 2.2 The set-up can be approved for production when none of the plotted points are closer to a control limit than one-third of the control limit zone (i.e., when all points are within the center on-third zone width between the control limits).
- 2.3 If the plotted points are closer to a control limit than one-third of the control zone width, the process is adjusted and a new subset is produced, measured, and plotted. When required, the Production Engineer assists with adjusting the process.
- 2.4 Approval of job set-up for production is recorded on the control charts used for the set-up verification. The set-up control charts are stored and retained together with production charts.

### 3. Process Performance Monitoring

- 3.1 All processes responsible for Special Characteristics are continuously monitored using SPC methods. In-process inspection is used for measuring the monitored product characteristics.
- 3.2 Process performance monitoring activities are governed by Procedure OOP-09-03 Statistical Process Control. Operators are provided with detailed SPC instructions, per Procedure OOP-09-02 Process Operator Instructions.
- 3.3 Control charts constitute the record of process performance monitoring.

### 4. Visual Inspections (Appearance Items)

- 4.1 Operators of processes responsible for color, grain or texture of parts classified as "Appearance Items" inspect appearance of the parts against approved masters.
- 4.2 Color masters are protected from direct light whenever possible, and when not in use are covered up or are stored in boxes. All appearance masters are periodically checked and recertified (frequency depends on durability, and is determined either by QA or the customer).
- 4.3 Work stations where appearance evaluation is carried out are equipped with appropriate

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lighting to simulate outdoor, interior, or other lighting conditions as specified by the customer.

- 4.4 Personnel engaged in evaluation of appearance items are provided with appropriate training. The training is usually provided on-the-job by area supervisors.
- 4.5 Visual inspections are recorded by a sign-off in the production work order, on the line where the visual inspection is called out.

### **5. In-Process Inspections (To Detect Nonconforming Product)**

- 5.1 In-process inspections that are carried out for the purpose of detecting and segregating nonconforming product are only required when processes are not capable and/or are not sufficiently stable. In-process inspections may also be prescribed following certain assembly operations, and other processes and operations that are not monitored by SPC.
- 5.2 In-process inspections are specified in the Production Control Plan and are called out in production work orders. Record of an in-process inspection is established by a sign-off in the work order on the line where the inspection is called out.

### **6. Release of Product**

- 6.1 Products are prevented from passing on to the next processing stage before all specified in-process verification activities are completed with satisfactory result. Products that are released for further processing or use are identified with a positive inspection status. The identification may be in the form of a sticker, tag, mark, color of container, or signed-off paperwork (work order) accompanying the product (refer to Procedure QOP-12-01 Inspection and Test Status).

### **7. Nonconforming Product**

- 7.1 If a nonconforming product is identified, the operator labels the product with a REJECTED sticker or tag and calls a QC inspector to prepare a product nonconformity report. Operators are prohibited from proceeding to repair a nonconforming product without first reporting to QA.

## **IV ASSOCIATED DOCUMENTS**

- Receiving Inspection — Oper. Proc. QOP-10-01
- Final Inspection — Oper. Proc. QOP-10-03
- Control of Nonconforming Product — Oper. Proc. QOP-13-01
- Statistical Process Control (SPC) Manual