



POSITROL

Plans and Logs

- A Plan For Controlling Variation
During Production -

By Mario Perez-Wilson



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- A Plan For Controlling Variation During
Production-

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POSITROL PLANS AND LOGS

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15. Positrol Log

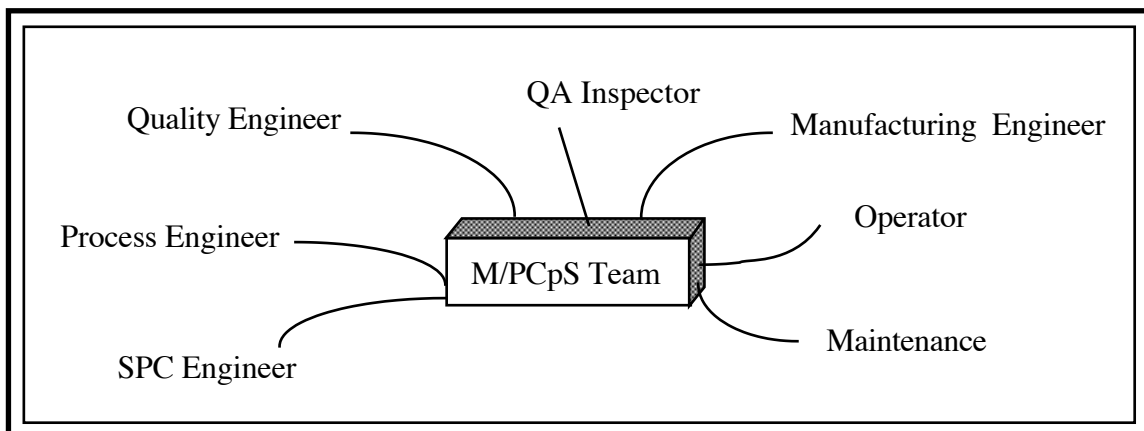
The Positrol Log is a checksheet in which production personnel enters data, information or observations from the distinctive characteristics of the process. The positrol log provides traceability of the changes in the characteristics of the process. It also specifies the limits of those characteristics and reactions when not within the prescribed limits.

16. Concentration Diagram

A concentration diagram is a graphical technique that concentrates the frequency of occurrence of defect as they appear physically in the product. The diagram is a picture representing the product and it shows the location where defects appear repeatedly.

Who develops the Positrol?

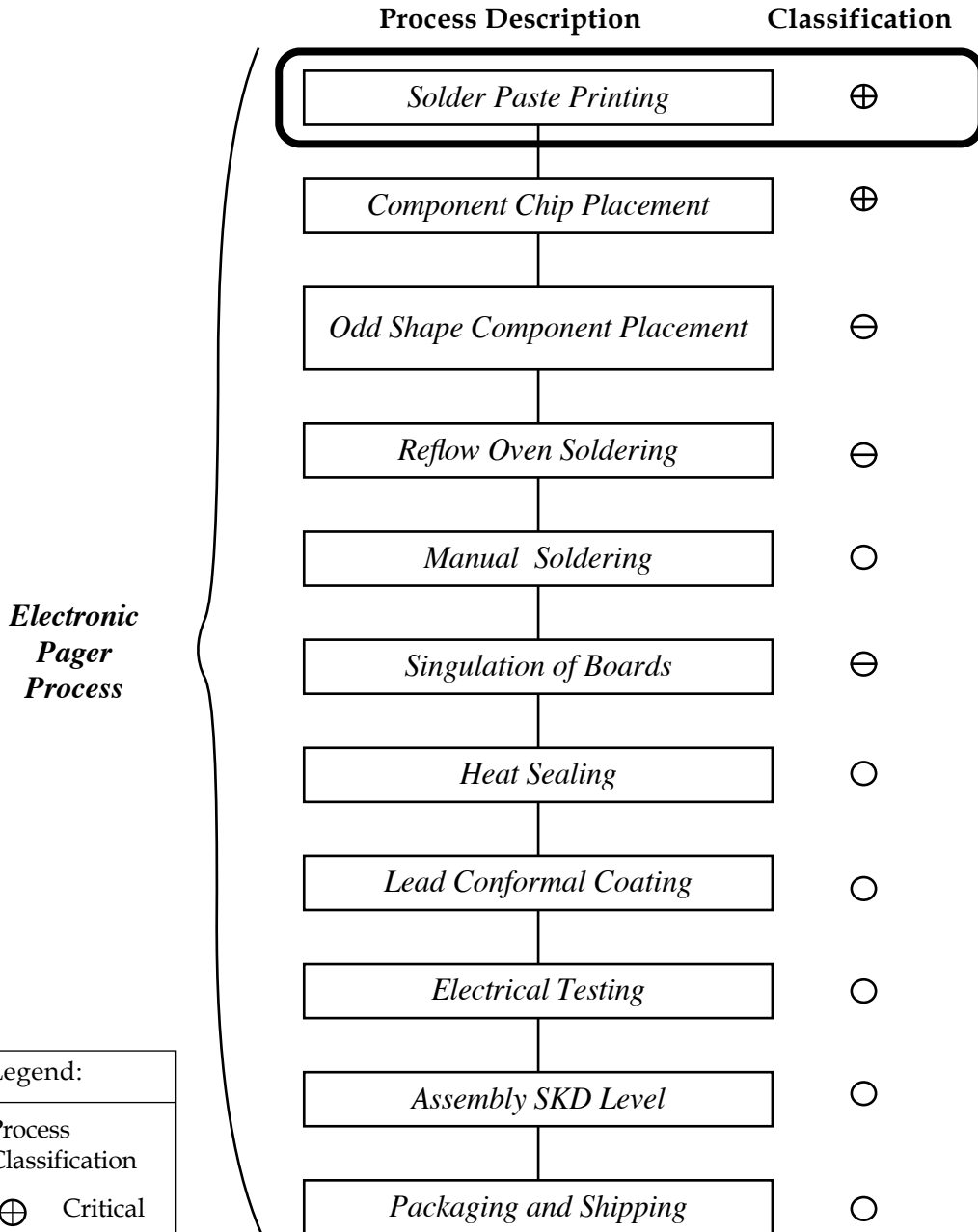
The Positrol is developed by a process characterization team (M/PCpS Team) during the last stage of the machine/process characterization study. It is usually the last thing done since it requires a considerable understanding of the process to know which are the distinctive characteristics that must be controlled. This team is usually comprised of process engineers, operators, technicians, maintenance personnel and other engineers from varied fields. Since the Positrol's main use would be in production, the operators should play an important role in its development. Since most of the monitoring and control of the process falls under the responsibility of the operators, they should check that all of the control systems are easy to implement during production. Once the M/PCpS Team has finished designing the Positrol plan, it is the responsibility of the production supervisor to approve it as a buy-off into production.



Members of a typical M/PCpS Team.

Electronic Pager - Solder Paste Screen Printer

The Solder Paste Printing process step is a critical step. Process Mapping of the Electronic Pager's process breaks down the process steps as follows:



Electronic Pager Process

Legend:

Process Classification

- ⊕ Critical
- ⊖ Major
- Minor

Electronic Pager - Solder Paste Screen Printer

To determine how much of an improvement we can expect to see in the solder paste screen printing process, we proceed to run a large sample with the process at its best levels.

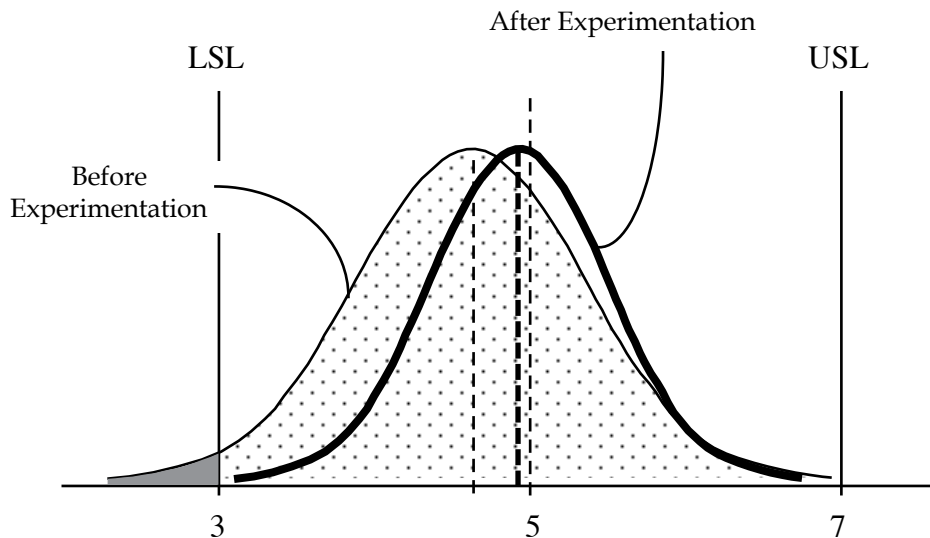
Squeegee Pressure	25 psi
Squeegee Hardness	80 durometer
Squeegee Speed	2 inches/sec
Snap-off height	0.040 inches

Results:

Descriptive Statistics

$\bar{X} = 4.92$
 $S = 0.63$
 $R = 0.90$
 $\zeta = 0.25$
 $\kappa = 2.86$
 $Cpk = 1.02$
 $Cp = 1.06$
 Normality = Yes

Solder Paste Height



The Solder Paste is a cream mixture made of 63/37 tin-lead and flux. Its texture should be smooth, without lumps or crusts on the surface. The paste should not show any separation of the flux from the solder balls. The solder paste should retain its stenciled definition after drying. And its viscosity should be between 800,000 and 1,000,000 centipoise to be suitable for screen printing and ease of dispensing.

The **WHAT** is a Solder Paste Viscosity of 900,000 ± 100,000 centipoise. The **HOW** is a Brookfield Viscometer to measure the viscosity of the paste. The **WHO** is the process technician and the **WHEN** is at the start of each shift. The measurement of viscosity is then entered into a Moving Range (MR) chart for **CONTROL**.

Other material properties that should be controlled during production are the smoothness in texture and the lack of lumps in the paste. Visual inspection should be used to check the solder paste for these properties.

Page	2 of 2	Solder Paste Screen Printing • Positrol Plan			Rev. Date	10-Jul-94
					Study No.	129-8-1
Process				Equipment / Tool		
Solder Screen Printing				MPM		FMEA
						Yes X No
Distinctive Characteristics						
What	PM	Materials				
	Preventive Maintenance	Solder Paste				
How	PM Check List	(Viscosity 900k ± 100k)				
Who	PM Technician	Brookfield Viscometer				
		(centipoise)				
When	Per PM Schedule	Process Technician				
Control	PM Check List	Start-up of each shift.				
		MR Chart				