Integrating a Control Plan Methodology into an MES System to Enhance Ease of Process Control

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ABSTRACT

Controlling a process is an important part of maintaining good yields and cycle time especially in high volume manufacturing. This paper will describe the implementation of integrating the concept of a control plan with process routers to improve consistent manufacturing process control.

With a manufacturing work force that consists of four shift coverage this provides challenges for process control in terms of prompt and consistent reaction to out of control process conditions. The use of a router system integrated with a process control plan provides consistency by containing the necessary information for process control. This web-based system contains a link to SAP documentation, easy to update OCAP information and a link to our FMEA system.

INTRODUCTION

Typically process control plans are utilized by Quality Assurance groups to document and keep track of the status of all significant process characteristics. The use of a process control plan is an excellent way to ensure significant characteristics are defined and understood. Below is an example of a typical control plan layout.

CONTROL PLAN									Revision Number	1.0			
									Date				
		Organization:											
		Location:											
Critical to Quality Characteristic	Sig. Char. #	Significant Characteristic Description	Chart Type	Chart Champion	Chart Location	Measurement Method	Measurement Study	Reaction Plan	Guage Number	Sampling Plan	Process Stability	Cp/Cpk	
A	A-1												
	A-2												
B	B-1												
	B-2												

Figure 1: Sample Control Plan format

TriQuint Florida has developed an MES system that allows the flexibility to design its process manufacturing routers to be displayed in a control plan format. This control plan is referred to as a Manufacturing Control Plan (MCP) and is an excellent tool used to display pertinent information about a process such as documentation, training plans, process control information as well as out of control action plans and FMEA's.

Process Control Plans are usually populated by significant characteristics of the process but in the Manufacturing Control Plan at TriQuint Florida it is dynamically customized at each step of the process, from the first step (issuing wafers to a lot) to the last (shipping the wafers). Below is an example of a single process step in the MCP. The blue indicates hyperlinks to live documentation, live tool status (facility UP/DOWN), and links to out of control action plans (OCAPs).

Work Center	Op	Op Description	Op Instructions	Work Instructions	Equipment	Recipe ID	Training Plans	Control Method	Sample (Size/Frequency)	OCAP
F2840	1150	AIT - Post UBM1		Rudolph Operating Procedure 100415-Rudolph Operating Procedure AIT Recipe Catalog OCR Instructions AIT OCR Instructions Operations.pdf	AIT1 (Up) AIT2 (Up) AIT3 (Up) ~~AIT4~~ (Recipe UA)	314334_POSTUBM1	TP Rudolph Operation 136849-TP Rudolph Operation	Product: Pass/Fail Criteria set at AIT Process Check: Pass/Fail Criteria set at AIT	Size: 5 Wafers randomly selected at AIT **Wafer ID's are important, please ensure wafers are id's on AIT match wafer id's on wafer NOTE: NRE's get 100% wafers inspected at all AIT steps *Freq:* Product: Variable Process Check: AIT Daily PCheck	Product: When lot FAILs Rudolph inspection put lot on hold for Litho Process Engineering AND run wafers that were not inspected Process Check: If AIT Process Check Fails Contact Yield Process Engineering and put tool down in Maint Connection POSTUBM1 Manufacturing OCAP.pdf

Figure 2: Manufacturing Process Control Plan

This paper will discuss further how the Manufacturing Control Plan is organized, trained against, updated, OCAP descriptions, live links to the FMEA system and how process control parameters are defined within.