Core Tools

APQP (Advanced Product Quality Planning) deliverables are discussed in conjunction with the PPAP (Part Approval Process) requirements. Course content discusses at high level the core tools requirements as later course content deep dives into the Core Tools: FMEA (Failure Mode Effects Analysis), Control Plans, and the documents required for PPAP. All content is based on the AIAG (Automotive Industry Action Group) standards and meet the TS16949 requirements.

P-FMEA Overview

Process Failure Mode Effects Analysis (PFMEA) is a structured analytical tool used by an organization, business unit, or cross-functional team to identify and evaluate the potential failures of a process. PFMEA helps to establish the impact of the failure, and identify and prioritize the action items with the goal of alleviating risk. It is a living document that should be initiated prior to process of production and maintained through the life cycle of the product. PFMEA evaluates each process step and assigns a score on a scale of 1 to 10 for the following variables:

Severity – assesses the impact of the failure mode (the error in the process), with 1 representing the least safety concern and 10 representing the most dangerous safety concern. In most cases, processes with severity scores exceeding 8 may require a fault tree analysis, which estimates the probability of the failure mode by breaking it down into further sub-elements.

Occurrence – assesses the chance of a failure happening, with 1 representing the lowest occurrence and 10 representing the highest occurrence. For example, a score of 1 may be assigned to a failure that happens once in every 5 years, while a score of 10 may be assigned to a failure that occurs once per hour, once per minute, etc.

Detection – assesses the chance of a failure being detected, with 1 representing the highest chance of detection and 10 representing the lowest chance of detection.

RPN – Risk priority number = severity X occurrence X detection. By rule of thumb, any RPN value exceeding 80 requires a corrective action. The corrective action ideally leads to a lower RPN number.

Control Plans Overview

A control plan is a written summary that describes what is needed to keep an improved process at its current level. This includes human resources and training requirements, actions that should be taken if measures are outside the specified range, and reactions needed to ensure process owners sustain the gains of process improvements. The purpose of the control plan is to ensure that performance improvements made by the project team are sustained over time. The plan is created during the improve phase of the DMAIC (define, measure, analyze, improve, control) approach or a similar phase of other methodologies. The project team should create the control plan along with the process owner and representation from all areas involved in the process. As

the process changes or process knowledge increases and as measurement systems and implementation methods are evaluated and improved, the plan should be updated.

Control Plan Benefits:

•Provides a summary of process knowledge

•Keeps process requirements and expectations visible for all functional area involved

•Describes data used to assess process performance (process and/or quality indicators)

•Describes when action needs to occur, how frequently to check performance, who is responsible for checks, and what the contingency plans are

•Describes who is involved and what their roles are in the process