Automotive Core Tools (APQP, PPAP, MSA, SPC, FMEA) Training Programme Outline

Course Overview

Automotive core tools are a set of essential techniques and methodologies used in the automotive industry to ensure the quality and efficiency of various processes throughout the product development and manufacturing lifecycle. These tools are critical for maintaining high standards of safety, reliability, and performance in automotive vehicles. The core tools are standardized globally and are often mandated by international quality management standards such as ISO/TS 16949 or IATF 16949. The key automotive core tools include:

1. Advanced Product Quality Planning (APQP): APQP is a structured approach to product development and launch, ensuring that quality is built into the product from the early stages of design.
2. Failure Mode and Effects Analysis (FMEA): FMEA is a systematic method used to identify potential failure modes and their effects on products or processes. It helps prioritize and mitigate risks.
3. Measurement System Analysis (MSA): MSA evaluates the measurement systems used to assess product characteristics, ensuring their accuracy, precision, and suitability for the intended purpose.
4. Statistical Process Control (SPC): SPC involves monitoring and controlling a production process to ensure that it operates within predefined statistical control limits, minimizing variation and identifying any potential issues.
5. Production Part Approval Process (PPAP): PPAP verifies that suppliers' production processes are capable of consistently meeting the required specifications. It involves documentation, part submission, and approval processes.

These automotive core tools collectively contribute to the overall quality management system of an automotive manufacturer. By implementing these tools, companies can identify and mitigate potential risks early in the product development and manufacturing stages, leading to improved product quality, reduced defects, and increased customer satisfaction. Additionally, compliance with these core tools is often a requirement for automotive suppliers seeking to participate in the global automotive supply chain.

Who should attend?

Attendance at automotive core tools workshops and trainings typically involves a cross-functional team representing various aspects of the automotive manufacturing process. Some of the key roles and personnel who should attend are: Process Engineers, Quality Engineers, Design Engineers, Supplier Representatives, Production Managers/Supervisors, Quality Managers, Maintenance Personnel, Risk Analysts, Continuous Improvement Specialists, Cross-Functional Leaders, Facilitators and Coordinators, In summary, Automotive Core Tools is a team effort that benefits from the involvement of individuals with diverse expertise and responsibilities. Cross-functional collaboration is crucial to effectively identify, assess, and mitigate process-related risks in the automotive manufacturing industry.

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Course Duration – 03 Days

Organizational Objective or benefits

1. To have a competent team with complete understanding & knowledge of Automotive Core Tools.
2. To have competent personnel who can perform daily activities on tools like (PPAP, APQP, MSA, SPC, FMEA)
3. To have a committed team who can create and maintain IATF Systems and Implementing the Automotive ore tools across the organization for improved quality and productivity.

Learning / Program objective

1. To acquire knowledge about 5 Core Tools (PPAP, APQP, MSA, SPC, FMEA)
2. Plan and initiate the CFT activities related to PPAP, APQP, MSA, SPC, FMEA
3. Prepare documents related to PPAP, APQP, MSA, SPC, FMEA as per IATF 16949 requirements and AIAG Guidelines.

Training methodology & Benefits

1. Class room activity based / Interactive online (Inhouse & Public Course)
2. Group discussion

Body of Knowledge / Contents

Advance Product Quality Planning

1. Significance of a APQP program
2. Planning and defining an APQP program
3. APQP in Process Design and Development
4. APQP Product and Process Validation
5. APQP Case Study
6. Feedback, Assessment and Corrective Action
7. Control Plans and Methodology

Production Part Approval Process

1. What is PPAP?
2. Purpose of PPAP and is relevance in the industry.
3. PPAP REQUIREMENTS
   a. Design Records

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b. Engineering Change Documents
c. Customer Engineering Approval, if required
d. Design Failure Modes & Effects Analysis (DFMEA)
e. Process Flow Diagram
f. Process Failure Modes & Effects Analysis (PFMEA)
g. Control Plan
h. Measurement Systems Analysis (MSA)
i. Dimensional Results
j. Material, Performance Results
k. Initial Process Study
l. Qualified Laboratory Documentation
m. Appearance Approval Report (AAR)
n. Sample Product
o. Master Sample
p. Checking Aids
q. Customer-Specific Requirements
r. Part submission warrant
s. PSW Customer Submission Levels 1-5

AIAG VDA Failure Mode Effect Analysis

1. History of FMEA
2. Introduction to FMEA
3. Key changes in new FMEA
4. DFMEA, PFMEA and FMEA-MSR
5. 7-steps methodology
6. New FMEA template
7. Structure Analysis
8. Function Analysis
9. Failure Analysis
10. Risk Analysis
11. Revised Severity, Occurrence and Detection tables and new Action Priority Table

Measurement System Analysis Statistical Process Control

1. Introduction to MSA
2. Why to learn MSA
3. What is a Measurement System?
4. Sources of Variation
5. Repeatability and Reproducibility
6. Accuracy and Precision
7. What is a GR&R Study?

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8. Benefits of a GR&R Study
9. Completing a GR&R Study (Variable)
10. GR&R Planning Considerations

Statistical Process Control

1. SPC concept and history
2. Understanding variation and statistical thinking
3. Data and data collection plan
4. Descriptive Statistics
5. Patterns in Data (Process Stability Analysis)
6. Normal distribution curve
7. Process Capability ratios and their Analysis (Cp, Cpk etc.)
8. Control charts – Variable and Attribute
9. Pp ,Ppk,Cpm and their differences.
10. How to implement a SPC project
11. Case study in SPC

Recommended Training and / or Experience (Pre-requisite)

A basic understanding IATF 16949:2016 requirements and/or work experience in automotive industry will be an added advantage for the participants to understand the programme easily.

Take away for participants

- To get the knowledge and understand the Automotive Core Tools requirement for automotive industry.
- To get hands-on knowledge about the 5 Core Tools (APQP, PPAP, MSA, SPC, FMEA) and perform the activities related to the same.

Certificate

Certificate of successful participation shall be issued to all the delegates who attend entire duration of the training and qualify the assessment.