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THE ORGANIZATION DEVELOPS A STANDARD IN QUALITY **MANAGEMENT**

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ABSTRACT

This article deals with paragraph 8.3 of the IATF 16949: 2016 International Automotive Standard and the APQP Guide developed by the AIAG (Automotive Industry Action Group) Automotive Industry Standardization Group and the Automotive Division of the American Society for Quality Management in the automotive industry. It is recommended to use the APQP method not only in the automotive industry, but also in any design and manufacturing areas.

KEYWORDS

IATF 16949:2016, AIAG, APQP method, flow chart, control plan, SPC, MSA, FMEA, PQC process steps and so on.

INTRODUCTION

The Fourth Guide to the Automotive Industry APQP- Advanced Product Quality Planning and Control Plan (internal and external) sets general requirements for suppliers to plan and manage the quality of future products [1-7].

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Product quality planning focuses on a single goal - to achieve mass production of automotive components in accordance with the wishes and requirements of the consumer. Paragraph 8.3 of IATF 16949: 2016 is based on the requirements of the APQP method in product design and technology and the APQP manual developed by the AIAG Automotive Industry Standardization Task Force and the ASQC Automotive Division of the American Society for Quality Management. The following organizational standard has been developed for [8-17]. By applying this APQP method in the design and production processes of products in any field of automotive industry, it is possible to achieve a high level of product quality. We have developed the following organizational standard for managing this APOP recommend its use [16-21].

Ts-Organization Standard

Future Product Quality Planning And Plan Control Program (APQP Process).

1. Purpose

The purpose of this standard is to ensure the planned quality of mass production of automotive components in accordance with consumer demand. The APQP process is to ensure that all participants are clearly collaborated and that stage requirements are met in a timely manner at an acceptable cost. The APQP process ensures that internal and external automotive component suppliers meet quality requirements based on the rule of their own initiative [22-28]. The implementation of the APQP process steps requires the participation of all departments in design, production preparation and component development.

2. Scope of application

This standard applies to all participants in the process stages, concept, prototype development, production preparation, and mass (serial) production processes.

3. Normative sources

- 3.1 GOST R 51814.6-2005 Systems of quality management in automobile construction. Quality management in planning, development and preparation of automotive components.
- Planning the quality of perspective production and the quality of the program APQP.Perevod s angl.-N.Novgorod. Russia: SMTs "Priority" 2001-126 p.
- 3.3 Ts 23677708-14: 2020 Process Statistical Management-SPC
- 3.4 Ts 23677708-15: 2020 Measurement System Analysis-MSA
- 3.5 Ц 23677708-16: 2020 Analysis of types and consequences of possible inconsistencies-FMEA

4. Terms and definitions

- 4.1 Automobile components raw materials, components and assemblies used in the manufacture and assembly of automobiles.
- 4.2 Future Product Quality Planning and Planning Control Program (APQP) is a guide to identify and

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implement all the steps necessary for the implementing company to meet the needs and desires of the consumer [29-34].

- 4.3 Process flow chart (Flor chart) a diagram consisting of no more than 7-10 typical characters and showing a visual sequence of production processes.
- 4.4 A control plan is a documented description of the systems and processes required to manage a product (usually in tabular form). The control plan includes the content of quality indicators specified in the technology process. Quality indicators can be customer-set, supplier-chosen, and significant.
- 4.5 Basic description of the vehicle component -A / V The level of the detail (part) is determined by the parts that affect the safety, environmental or functional (quality, reliability) performance of the vehicle.
- 4.6 Quality Control Point (PQC) is a key indicator of the product that affects the vehicle or its assembly.
- 4.7 Supplier (automotive component) a legal entity that plans and (or) manufactures automotive parts for the purpose of delivery.
- 4.8 Consumer a legal entity that purchases automotive components and manufactures them for automobiles or their components.
- 4.9 Analysis of Potential Failure Mode and Effects Analysis (FMEA- Potential Failure Mode and Effects Analysis) is an effective tool for improving the quality of the technological processes being

created, aimed at eliminating the defect or reducing its adverse effects [31-37].

- 4.10 Statistical Process Control (SPC) is a method of statistical analysis of a process and control of its variability.
- 4.11 Measurement System Analysis (MSA) A method of statistical analysis of measurement processes in the general process of production and control of the variability of measurement systems.
- 4.12 APQP group / team a team consisting of representatives of quality, production technology, product design, localization, supplier and consumer specialist if necessary.

5. Responsibilities and rights

- 5.1 The head of the enterprise:
- -Approval of APQP group members; continuous verification of the effectiveness of the decisions periodic monitoring made: of project implementation;
- 5.2 Head of Technology Department:
- team building, working as a team, ensuring solidarity with other teams and individuals; sequential and parallel execution of design stages in accordance with the established plan period; identification of internal and external consumers: determination of selection criteria for specialists to be recruited from the supplier to the team; taking into account consumer requirements in design and testing. Evaluate the design, implementation and preparation processes;

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determination of costs, taking into account the norms; identification of consumer assistance requirements; identify process or method documentation [39-42].

5.3 APQP Group / Team Leader:

- Ensuring the knowledge of team members in meeting the needs and desires of consumers; ensuring that each APQP team member is assigned responsibilities and rights in accordance with the identified responsibilities.

5.3 APQP group / team members:

-participate in group meetings and make suggestions; ensuring compliance with consumer requirements and wishes; duty, responsibility and observance of rights.

6. Job content

6.1 Head of Technology Department

APQP should form a team.

- selection of the APQP team leader; create an inter-functional APQP command; the team should include representatives of marketing, design, production, quality, procurement, sales, service, etc. If necessary, specialists from other organizations can be invited to the APQP-team. Each APQP-team member should be assigned responsibilities and rights in accordance with the defined tasks; planning and coordination of all tasks on the APOP-process to ensure quality assurance in the mass production of future products. Disclosure of consumer interests and desires (QFD - Quality Function Deployment

members method); assign duties and responsibilities (responsibility matrix); defining the responsibilities and rights of each person and / or subcontractor involved; attracting the consumer and the main supplier; determination of costs, deadlines and other limitations; assessment of the feasibility of the requirements and the proposed technical and organizational decisions; identify documentation of processes and methods. Ensuring the knowledge of team members in fulfilling customer demands and wishes. Planning, development of the concept (idea) and planning of product quality assurance; design and development of automotive design and development of components; technological processes; final preparation for the production of auto components; measures for production and improvement (feedback. evaluation and corrective). All the above steps should be aimed at a single goal to achieve mass production of automotive components in accordance with the wishes and requirements of the consumer.

6.2 Create a temporary sample graph of the APQP process

The APQP team should use the quality program to develop a temporary schedule plan, set a clear execution time in flour stages, and focus all attention on eliminating the root causes of nonconformity (DFMEA, PFMEA, MSA, SPC, etc.) by properly allocating costs.

6.3 Develop an APQP process calendar plan

APQP-process development of a calendar plan based on a temporary sample schedule. The plan

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should specify all measures, deadlines and necessary resources. The term in the plan depends on the needs and desires of the consumer, as well as the type and complexity of the auto component. Ensure that all members are in agreement. It is necessary to monitor the implementation of the plan.

6.4 Development of Quality Control (S / R) Plan

A management plan for troubleshooting should be prepared: prepare an experimental sample, develop a specified quantity, and develop for mass development stages (Appendix A).

6.5 Develop a process flow map

The process of making autocomponents is to create a visual flow chart of the processes.

The process flow chart and control plan should be mutually agreed. The FMEA team should periodically review the process flow chart to improve and analyze the auto component manufacturing process.

6.6 Ensure serial and parallel operation

Ensure that input and output results are executed sequentially and in parallel during the process stages.

6.7 Identify project management risks

The APOP-team should formalize the problems encountered during the design process.

When a problem occurs, the team should analyze the risks and suggest the necessary measures to solve the problem. In severe cases, special methods of problem solving should be adopted and approved by the organization's management.

6.8 Procedure for implementing the process steps of the APQP command

Phase 1, planning, developing the idea and implementing the product quality assurance plan:

- entry information; general information or "consumer voice" (market research results. collected quality and warranty information, experience of team members); business plan and marketing key indicators strategy; competitors' products / processes; product / process analysis; the results of the study of product reliability; information from a trusted consumer.

Phase 1 results (Phase 2 introduction data):

- purpose of the project; quality and reliability goals; list of source materials; initial flow chart of of processes: preliminary data specific descriptions of products and processes; product quality assurance plan; support by management.

Phase 2) product design and development

- determine the final characteristics and design characteristics of the vehicle component (a / c) on the basis of all volumetric and critical analysis of technical requirements, technical data, test results, etc. Whether the project was created by a customer or an external organization, the APQP should consider the source of all team developments.

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Phase 2 should ultimately be an initial analysis of the possibility of creating an autocomponent design by assessing the problems that may occur during the manufacturing process.

Phase 2 results: (for DFMEA)

Analysis of the types and consequences of possible design inconsistencies (DFMEA):

- Ensuring technology and aggregation; project approval: project analysis: creating experimental model and a management plan for it; material descriptions; technical drawing (including mathematical results); technical requirements; changes in drawings and technical requirements.

Phase 2 results (for APQP-command):

- New requirements for equipment, tools and fittings; special descriptions of products and processes; requirements for measuring and testing instruments; the team's conclusion on the feasibility of the project; support the leadership.

Step 3. Process design and development

Phase 3 is the creation of all technological and production process developments in the final form, reviewing the key features of production processes in relation to the management plan to achieve quality product production.

Phase 3 results:

- process flow map; shop location plan; description matrix (process: product); process PFMEA (analysis of types and consequences of possible inconsistencies in processes); packaging standard and requirements; management plan for the specified number of products; product / process quality system analysis; instructions for (operators); workers measurement system (Ts analysis plan 23677708-15: 2020 Measurement system analysis-MSA); product / process quality system analysis; process feasibility study plan (Ts 23677708-14: 2020 Process Statistical Management-SPC); leadership support.

Phase 4 Final preparation for the production of auto components

- Ensuring all quality requirements and achieving full production of automotive components, taking into account the growth of production. At this stage it is necessary to evaluate the mass production and highlight key aspects. It is necessary to confirm that the product meets the requirements of the consumer, the management plan and the process flow chart are followed. Identify additional measures in order to solve the problem before the start of mass production and study their root causes.

Step 4 results:

- Ensuring agreed mass production; evaluation of the measurement system analysis; initial study of the possibility of processes; agreeing on the production of components; testing for production approval; evaluation of packaging; production quality program; mass production management plan; approval of auto component production; production readiness (act) act and support of management.

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production Phase 5 Measures for and improvement

- approval of the readiness of technological components for production and technological processes; assessment of their output at the stage of preparation of auto components (all the usual and special causes of variability); Evaluate the effectiveness of previous stages of the APQP process; assessment of compliance with product or service quality requirements; creating a management plan for production; mass evaluation of quantitative and qualitative results; fulfillment of consumer requirements by all descriptions; setting specific descriptions.

Phase 5 results:

-reduction of variability ((Ts 23677708-14: 2020 Statistical control of processes-SPC); GOST R 51814.3); increase consumer satisfaction; shipping and service.

6.9 The APQP team leader should arrange for the following applications to be completed and maintained in good condition. It is recommended to use the APQP guide when filling them out.

Conclusion

1	It can be done	It is possible to develop a product without rethinking how it is installed.
2	It can be done	Modification recommended (see appendix)
3	It is impossible to do	A design revision is required for the product i / ch according to the established requirements.
Name / surname, signature, position and date of team members:		
7		

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