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**Quality Safety of Household Electrical Appliances –
Guidelines for Monitoring and Evaluation in the
Manufacturing Process**

家用电器质量安全 生产过程状态监测与评价指南

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Table of Contents

Foreword	3
1 Scope	4
2 Normative References	4
3 Terms and Definitions.....	5
4 Guiding Principles.....	6
4.1 Design.....	6
4.2 Raw Materials and Components.....	6
4.3 Manufacturing	7
4.4 Environmental facilities	7
4.5 Personnel.....	8
5 Factors of Quality Safety in the Manufacturing Process	8
5.1 Structural factors	8
5.2 Information factors	9
6 Evaluation of Quality Safety in Manufacturing Process.....	10
6.1 Evaluation factors.....	10
6.2 Evaluation method.....	10
6.3 Evaluation process.....	11
Appendix A (Normative) Quality Safety of Food-Contact Household Electrical Appliances - Monitoring and Evaluation in the Manufacturing Process	13
Appendix B (Normative) Quality Safety of Customized Household Electrical Appliances - Monitoring and Evaluation in the Manufacturing Process	15
Bibliography	18

Quality Safety of Household Electrical Appliances – Guidelines for Monitoring and Evaluation in the Manufacturing Process

1 Scope

This Document provides guidance and suggestions for monitoring and evaluating the design, raw materials and components, production, environmental facilities, personnel, etc. related to product quality safety in the manufacturing process of household appliances. It proposes the factors that need to be considered for the quality safety of the manufacturing process and the factors, methods and processes of quality safety evaluation. At the same time, it provides guidance and suggestions for the monitoring and evaluation of quality safety status in the manufacturing process of food-contact household electrical appliances and customized household electrical appliances.

This Document is applicable to the monitoring and evaluation of the quality safety status of the manufacturing process by manufacturers of household appliances (including but not limited to food-contact household electrical appliances and customized household electrical appliances), and other similar enterprises may refer to this Document for implementation.

2 Normative References

The provisions in following documents become the essential provisions of this Document through reference in this Document. For the dated documents, only the versions with the dates indicated are applicable to this Document; for the undated documents, only the latest version (including all the amendments) is applicable to this Document.

GB 4706 (all parts) Safety of Household and Similar Electrical Appliance

GB 4806 (all parts) National Food Safety Standard

GB 4806.1-2016 National Food Safety Standard - General Safety Requirements on Food Contact Materials and Articles

GB/T 14536 (all parts) Automatic Electrical Controls for Household and Similar Use

GB/T 26572 Requirements of Concentration Limits for Certain Restricted Substances in Electrical and Electronic Products

GB/T 30976.1 Industrial Control System Security - Part 1: Assessment Specification

3.8 Traceability

The ability to understand the raw materials used in the product, the source of parts and components, and the production status (including but not limited to processing, assembly, and testing), etc. according to the marking, inspection and testing, and other information data of the household appliances during the manufacturing process.

4 Guiding Principles

4.1 Design

In order to ensure the quality safety during the manufacturing process of household appliances, the following principles should be followed in the design:

- a) The design of household appliances shall fully consider the potential failure modes in the manufacturing process in terms of mechanical danger, mechanical injury, stability, durability, electric shock protection, electromagnetic compatibility, etc. Do well in design prevention, ensuring the use safety of the household appliances, so that avoid the hidden dangers of quality safety arising from the unscientific and unreasonable design of the whole machine and parts.
- b) In the links of material selection and process design, the adaptability in the manufacturing process should be considered to avoid possible process defects and hidden dangers of quality safety;
- c) Design and plan the manufacturing process of household appliances; determine the critical control points and operation and inspection instructions during the manufacturing process, so that effectively control the quality safety risks of household appliances;
- d) For the design-related technical information files (for example, manufacturing procedures, design drawings, design input, design output, etc.) involved in the manufacturing process, a process record file with traceability shall be formed.

4.2 Raw Materials and Components

In order to ensure the quality safety of household appliances during the manufacturing process, the following principles should be followed in terms of raw materials and components:

- a) It is crucial to evaluate the pre-tested raw materials and components in the manufacturing process to confirm compliance with the durability requirements in GB/T 14536 (all parts) and GB 4706 (all parts). For components that are not tested individually, and do not confirm whether complying with GB/T 14536 (all parts) and GB 4706 (all parts), as well as that do not have markings, or do not use according to the marking, the quality control should be carried out as the critical control points during the manufacturing process.

- b) For the raw materials and components that are used in the manufacturing process of household appliances, confirm that they meet the requirements for the restricted use of toxic and hazardous substances in GB/T 26572;
- c) For the raw materials, components and parts that are used in household appliances and affect the quality safety, traceability from procurement, processing, assembly to finished product is required.

4.3 Manufacturing

In order to ensure the quality safety of household appliances during the production process, the following principles should be followed in manufacturing:

- a) In order to ensure that the quality safety status of household appliances in the manufacturing process meets the requirements, it is very important to formulate the procedural requirements, process specifications, operating procedures, process requirements, control methods, etc. corresponding to the complete product manufacturing process according to the corresponding standards and technical agreements;
- b) Identify and evaluate factors that may affect the quality safety of household appliances in the manufacturing process; formulate control methods for the factors; eliminate and reduce product quality safety risks caused by various factors; and carry out verification that complies with provisions at critical control points that affect the quality safety of household appliances;
- c) Evaluate the personnel who directly affect the quality safety of household appliances in the manufacturing process, including but not limited to production personnel; and eliminate or reduce the quality safety risks caused by personnel factors, such as: professional skills, health, vision, hearing, physical strength, etc.;
- d) Evaluate the equipment, tooling and related tools that directly affect the quality safety of household appliances in the manufacturing process; and eliminate or reduce the quality safety risks caused by equipment factors. For example, whether the equipment has returned to normal production status after maintenance;
- e) For the monitoring and evaluation process of the quality status of food-contact household electrical appliances and customized household electrical appliances in the manufacturing process, the monitoring and evaluation of the quality safety status in the manufacturing process shall be carried out according to Appendixes A and B.

4.4 Environmental facilities

In order to ensure the quality safety of household appliances in the manufacturing process, the following principles should be followed in terms of environmental facilities:

- a) The overall layout of the manufacturing, administration, living and auxiliary areas of the

process should meet the relevant requirements. For mechanical failures that shall affect the quality safety of household appliances, they should be used as critical control points for quality control. It can ensure the reliability of critical control points according to the relevant required insulation resistance test, withstand voltage test, leakage current test, grounding resistance test, etc. The manufacturing process may include but not limited to the following critical control points according to the category of household appliances:

- a) The strength of the welding, additional leakage requirements should be added for the welding of pipelines and pressure vessels;
- b) the strength of the fastener connection;
- c) the strength of the riveting;
- d) the strength of the bond;
- e) the strength of the bearing connection;
- f) the strength of the plastic parts connection (e.g., buckles);
- g) the strength of the installation of structural components;
- h) the reliability of patch cord connection and terminal connection;
- i) the parts related to heat conduction and heat dissipation should be installed reliably and effectively;
- j) the reliable connection of grounding parts;
- k) the tightness of liquid (gas) containers and pipelines;
- l) the strength and pressure resistance reliability of liquid (gas) containers and pipelines, etc.

5.2 Information factors

The information security in the manufacturing process should meet the requirements of GB/T 30976.1. For the information security factors that shall affect the quality safety of household appliances, it should be used as a critical control point for quality control; and the evaluation of information systems and industrial control equipment can be used to ensure information security, see GB/T 30976.1 for specific evaluation criteria. The manufacturing process includes but is not limited to the following critical control points:

- a) completeness and accuracy of data and information;
- b) completeness and accuracy of command input and output;
- c) storage of information on different components and information security;

Determine the critical control points that affect the quality safety in the manufacturing process; evaluate the implementation of the quality of the critical control point; and according to their contribution in the process, the evaluation result is obtained by giving a certain weight and superimpose.

6.3 Evaluation process

The monitoring and evaluation process of quality safety state in the manufacturing process includes evaluation preparation (determine evaluation objects, evaluation scope, collection of evaluation information, etc.), quality state monitoring and data collection, analysis and evaluation of influential factors, formation of evaluation conclusions and improvement suggestions, etc. The specific evaluation process mainly include:

a) Evaluation preparation:

- Clarify the evaluation object and evaluation scope;
- Determine the quality safety evaluation factors, and clarify the required data, information resources and their collection methods;
- Establish an evaluation working group and formulate an evaluation work plan.

b) Factor evaluation:

- Collect relevant information around the evaluation factors;
- Determine the critical control points, monitor the quality safety status of the manufacturing process, and collect relevant data;
- Verify and confirm the collected information and data to ensure the accuracy of data and information resources;
- Identify, confirm and analyze the factors affecting quality safety, and carry out quality safety factor evaluation according to the evaluation method.

c) Evaluation conclusions and improvements:

- Form the evaluation conclusion according to the comprehensive analysis and evaluation;
- Record the problems of the factors and links that have quality safety risks in the manufacturing process, and conduct critical improvement.

The process of monitoring and evaluating the quality safety status in the manufacturing process is shown in Figure 1.

Appendix A

(Normative)

Quality Safety of Food-Contact Household Electrical Appliances - Monitoring and Evaluation in the Manufacturing Process

A.1 Overview

This appendix puts forward relevant suggestions on factors that affect quality safety of food-contact household electrical appliances in the manufacturing process, such as raw materials and components, personnel, environmental facilities and equipment, etc.

A.2 Raw materials and components

The raw materials and components that are used in the manufacturing of food-contact household electrical appliances should follow the following principles:

- a) The raw materials and components of food-contact household electrical appliances should meet the special requirements of GB 4806 (all parts), and should be evaluated in terms of safety, hygiene and antibacterial aspects;
- b) For the raw materials and components of food-contact household electrical appliances, relevant verifications (for example, authorization, etc.) that shall be completed in accordance with the requirements of relevant food-contact materials (including inks, adhesives, lubricants, etc., which may be in direct or indirect contact) during inspection is very necessary;
- c) Raw materials and components that are used in the manufacturing of food-contact household electrical appliances should be stored in separate zones to prevent misuse;
- d) The raw materials and components that are used in the manufacturing of food-contact household electrical appliances are confirmed to meet the requirements of 3.1 and 3.2 in GB 4806.1-2016;
- e) Fully consider the possible contamination of the used auxiliary materials (such as cleaning agents, mold release agents, Vaseline, etc.) during manufacturing and processing; and consider that the use of food-contact raw materials and additives in the manufacturing process may affect the final product.

A.3 Personnel

In order to ensure the quality safety of food-contact household electrical appliances in the manufacturing process that, the following principles should be followed in terms of personnel:

- a) The processing and assembling personnel engaged in the manufacturing of food-contact household electrical appliances shall have corresponding sanitation and technical authorizations;
- b) Carry out food safety training, assessment and authorization for the personnel manufacturing food-contact household electrical appliances;
- c) The manufacturing workshop personnel shall strictly abide by the relevant sanitation system, keep individuals clean and hygienic; and visitors follow the same hygienic requirements when entering the workshop;
- d) The inspectors of food-contact household electrical appliances shall be familiar with product inspection regulations; and shall have certain food safety knowledge, skills and corresponding qualifications.

A.4 Environmental facilities and equipment

In order to ensure the quality safety of food-contact household electrical appliances in the manufacturing process, the following principles should be followed in terms of environmental facilities and equipment:

- a) It should be ensured to keep a corresponding distance between the manufacturing plant of food-contact household electrical appliances and the toxic and harmful pollution sources; and the manufacturing environment of the products meets the requirements of hygiene and food safety;
- b) Possessing and maintaining sanitation, ventilation, handling, conveying and other facilities that match the manufacturing capacity and hygienic requirements is an important factor to ensure the quality safety of food contact household appliances in the manufacturing process;
- c) Equipment that uses plastic, rubber, silica gel, spraying and other materials and processes for the manufacturing of food-contact household electrical appliances should be distinguished from other equipment to prevent mixed use; in addition to general maintenance, the equipment should also be subject to special maintenance that meet the manufacturing requirements.;
- d) Chemicals such as cleaning materials, lubricants, adhesives, mold release agents, cleaning agents, and disinfectants used in the equipment are classified and labeled according to their uses to ensure safe storage and use and avoid product contamination.

ensure suppliers' technical, manufacturing, supply and quality control capabilities; and ensure that purchased items meet the requirements;

- b) Establish scientific and reasonable customized production material collection plans and inventory management methods, and store production material information;
- c) Take input and traceability management of main materials and differentiated materials for personally-customized products, including material assembly, error prevention, and traceability; and generate record data for the main materials and differentiated materials of customized products when they are put into the assembly process. In terms of data management and error-prevention management of customized components, see the contents of 8.4 and 8.5 in GB/T 39102-2020.

B.4 Manufacturing

B.4.1 Manufacturing equipment

Manufacturing equipment mainly includes the following:

- a) Equipment used for customized production shall be distinguished by obvious signs;
- b) There is interconnectivity and integration BETWEEN manufacturing equipment AND intelligent sensor control equipment and intelligent assembly equipment;
- c) Regularly inspect, evaluate and maintain manufacturing tools, molds and equipment. Before using the manufacturing equipment, a trial operation should be carried out to verify its accuracy and precision. After the equipment is repaired, it should be re-verified, ensuring it meets the requirements can it be put into production again. Try to eliminate or reduce product quality safety risks caused by equipment factors.

B.4.2 Manufacturing technology

The manufacturing technology mainly includes the following:

- a) Use process drawings, circuit diagrams, assembly drawings and other documents and related software to accurately describe the technology requirements of customized products; optimize technology design, strictly control the technology conversion process, and improve the reliability of products on the manufacturing line;
- b) To manage the manufacturing technology of personally-customized products, it should pay attention to the special requirements of personalized orders on the man, machine, material, method, environment in the manufacturing process; and do a good job in technology error prevention, such as error prevention in the aspects of special parts distribution, customized special parts feeding, and personally-customized assembly, etc.

B.4.3 Information collection and monitoring in manufacturing process

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