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Industrial design - Guidelines for the evaluation of product form design

工业设计 产品形态设计评价指南

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Foreword

This document is in accordance with the provisions of GB/T 1.1-2020 "Standardization Work Guidelines Part

1.Structure and Drafting Rules of Standardization Documents". Drafting. Please note that some content in this document may involve patents. The issuing organization of this document assumes no responsibility for identifying patents. This document was proposed and is under the jurisdiction of the National Industrial Design Basic Standardization Working Group (SAC/SWG31). This document was drafted by: China National Institute of Standardization, Zhongke Xintiandi (Hefei) Environmental Protection Technology Co., Ltd., and Hangzhou Hezhi Standard Technical Service Co., Ltd. Service Co., Ltd., Zhejiang Jinyue Protective Equipment Co., Ltd., Hengjie Sanitary Ware Group Co., Ltd., Nanjing University of Aeronautics and Astronautics, Shandong Provincial Standardization Research Institute Research Institute, China Great Wall Technology Group Co., Ltd., Chengdu Potential Artificial Intelligence Technology Co., Ltd., Guangzhou Saichuang Industrial Design Co., Ltd. China Standard Technology Group Co., Ltd., Hunan University, Guangzhou Yingteng Information Technology Co., Ltd., Guangdong Hesheng Thermal Energy Technology Co., Ltd., Rifeng Enterprise Group Co., Ltd., Guangdong Marubi Biotechnology Co., Ltd., Computer Network Information Center of Chinese Academy of Sciences, Weihai Municipal Product Quality Management Center China Institute of Metrology and Testing, China University of Mining and Technology (Beijing), China Jiliang University, and China International Engineering Consulting Corporation. The main drafters of this document are. Xu Yingcheng, Wang Yanfeng, Zheng Ping, Gao Xiaohong, Wang Shasha, Pei Fei, Zhang

Shijuan, Zhao Huan, Zhu Xianghua, Jiang Ao, and Xie Xueping. Qian Liming, Yang Yuexiang, Li Jianping, Tao Shan, Wang Wei, Liu Fang, Yin Xueyuan, Kong Cheng, Wang Xiaoqiang, Fang Yan, Lin Xiyong, Nie Yanfeng, Li Ying, Qi Kai, Zhang Xin, Zhu Peiwu, Ye Hui, Mai Haizhan. Industrial Design Product Form Design Evaluation Guide

1.Scope This document establishes the basic principles and indicator system for evaluating product form design in industrial design, and provides evaluation methods, procedures, and levels. Suggestions for division. This document applies to activities related to the evaluation of product form design in industrial design.

1 Scope

GB/T 47530-2026 is the Chinese national standard covering how a product's form is judged - the criteria on function and usability, on the coherence of the form language, on manufacturability and cost, and on the response of the intended user, and the method by which those are weighed. First edition, in force since 1 November 2026, the evaluation companion of GB/T 47531-2026 on form design itself. It was issued on 30 April 2026 and takes effect on 1 November 2026, as a first edition. The document is under the responsibility of the Standardization Administration of China. This page is published from the official record of the 2026 edition; the clause text of a standard this recent is not yet in circulation, and the figures, limits and tables it contains are those of the document itself, delivered in full with the English translation.

6.2.2 Preparations before evaluation Clearly define the evaluation objectives and scope, define the core dimensions of the evaluation, such as functionality, aesthetics, and human-computer adaptability, and clarify the evaluation object (the whole). (Machine/component/conceptual solution), applicable scenarios, and evaluation boundaries. Establish a product form design evaluation team, whose members include, but are not limited to, project managers, design experts, technical experts, quality inspectors, and... User representatives, etc., were identified, and their respective roles and responsibilities were clearly defined.

6.2.3 Selection of Indicator System Depending on the product design requirements, and considering one or more characteristics of the evaluation object, the evaluation index system in Chapter 5 includes specific measures. Select one or more indicator systems selectively.

6.2.4 Selection of Evaluation Method Based on the characteristics of the evaluation object, select an appropriate evaluation method, such as the analytic hierarchy process (AHP), the Delphi method, or the data envelopment analysis (DEA), and provide corresponding support. Tools such as ergonomic measurement equipment, aesthetic evaluation scales, and data statistical analysis software are required.

6.2.5 Determine the weights of the indicators Based on the selected indicators, the analytic

hierarchy process (AHP) can be used to determine the weights and calibrate them. Appendix B provides the AHP method for determining weights. The process of determining weights.

6.2.6 Implementation Evaluation Collect various types of data for product form design evaluation, including but not limited to user survey data, market sales data, and user experience data. Verification data, etc. Based on the existing indicator system and weights, qualitative and quantitative analysis methods are used to perform numerical calculations on the collected data, and Analyze the calculation results. If the results are unsatisfactory, repeat the above steps and evaluate again; if the results are satisfactory, submit an evaluation report. The notice was written.

6.2.7 Provide an evaluation report. Provide a product form design evaluation report.

7.Classification Based on the evaluation results, the product form design level can be divided into three levels from high to low. A (excellent), B (medium), and C (low). Grade A (Higher) and Grade B (Average).

4 Basic Principles

4.1 Principle of Objectivity Based on measured data, avoiding subjective bias, and employing a combination of quantitative and qualitative evaluation methods, we ensure standardized processes and fair and reliable results. To trace back.

4.2 Systematic Principle The evaluation indicators cover core dimensions such as form and structure, aesthetic expression, human-computer interaction, functional integration, craftsmanship and materials, and green design, avoiding a one-sided approach. Evaluation.

4.3 Principle of Practicality The evaluation closely follows the product type, usage scenario, and target user needs, prioritizing functionality, ease of operation, and human-computer interaction.

4.4 Sustainability Principle The evaluation criteria should consider the suitability of the form factor to production processes and cost control, as well as the application of environmentally friendly materials and energy consumption throughout the entire life cycle, to ensure sustainability. Development requirements.

5 Indicator System

5.1 Overview Product form design evaluation aims to measure the quality level of the design, and its index system can be established according to Chapter 5 of GB/T 47531-2026. Establishment, among which the primary indicators include.

---Evaluation indicators for structural elements of form focus on the physical framework construction of the product's shape, evaluating the harmony of form, proportionality, and structural layout. The rationality of the layout and the refinement of the transitions are the

fundamental guarantees for product form design;

---Evaluation indicators for aesthetic expression elements focus on the visual and emotional value of product form, evaluating the clarity of semantic meaning in shape and the appropriateness of color. Matching properties, material texture, and exquisite detail;

---Evaluation indicators for human-computer interaction elements focus on the matching degree between product form and user physiological and psychological characteristics, and evaluate operational comfort and cognitive performance. Intuitive guidance, effective security protection, and adaptability to multiple scenarios;

---Evaluation indicators for functional integration elements focus on the compatibility between form and product function, evaluating the compliance of core functions and the compatibility of auxiliary functions. Sexuality and functionality expansion compatibility;

---Evaluation indicators for process and material elements focus on the feasibility of morphological implementation, evaluating the feasibility of process adaptation, material processing adaptability, and cost. This ensures the controllability of mass production.

---Green design element evaluation indicators focus on the green development value of form and evaluate the compatibility of environmentally friendly materials and their optimization throughout the entire life cycle. And modular maintainability.

5.2 Structural Elements

5.2.1 Aesthetic Harmony Evaluate the unity and visual balance of the product's geometric form, including but not limited to.

---Consistency in geometric language, such as when the overall design uses curves, there should be no abrupt straight lines interfering with local components;

---Outline integrity, such as the overall product outline without fragmented design, forming a visually organic whole;

---Feature echoing, such as the curvature of edges and corners, and the hollow structure, maintains a consistent style among the components. The focus of form coordination is on the sense of order and integrity in the design, avoiding visual fragmentation.

5.2.2 Proportional Adaptability Evaluating the scientific validity and suitability of product size proportions, including but not limited to.

---Overall proportional balance, such as the length, width and height ratio conforming to the golden ratio or the aesthetic preferences of the target users, with no obvious proportional imbalance;

---Component size coordination, such as a reasonable ratio between the screen and the bezel size, so as not to affect the use and visual experience;