

IAQ QUALITY SUSTAINABILITY AWARD 2021 - ONE-PAGE SUMMARY

The One-Page Summary should be filled in and submitted as Appendix 1 to your Application. It will also be published on the IAQ Quality Sustainability Award Homepage; <http://iaqaward.com>. The length of this document must not exceed 1 page.

Project and contact details

The name of the quality sustainability project (max. 100 characters)

Application of QFD and CAE for visual transparent packaging to resource waste and improve the environment

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Organisation(s), country, where the project-members are working, including Web-page links

Qingdao Haier Washing Machine Co. LTD, Qingdao, China.

Project description

The paper packaging widely used at present has the following problems: large consumption of paper, water wasting when production and recycling, it is not conducive to environmental protection; Appearance damage cannot be observed directly, which brings huge losses to enterprises and leads to complaints from users. Since December 2018, after the investigation of Haier team, based on the market environment and user needs, the key test conditions and load state of transparent packaging were determined by USING QFD, and the key technical indicators were formulated in combination with the production and manufacturing process, including appearance requirements, physical and mechanical performance requirements, dimensional tolerance, etc. Under the testing framework for the appearance reliability of transparent packaging, the formula of transparent film material and method of the reliability test is optimized by DOE, the numerical requirements of all technical indicators of transparent packaging were finally determined, and the test standards of each technical indicator were formulated to achieve quantitative and controllable standards.

In order to solve the difference between the physical and mechanical properties of transparent packaging film material and carton material, CAE simulation analysis technology is adopted. The risks in the actual circulation of products are pre-studied by using nonlinear quasi-static statics simulation algorithm with large deformation and nonlinear impact dynamics simulation algorithm. The validity of the design is verified by the test of enterprise standard transportation test and the test of actual market transportation.

Through the application of this project, the domestic transparent packaging application market is opened, and the transparent packaging will play a demonstration role, so as to radiate to other industries and provide a reference path for the green development of the packaging industry. The transparent packaging scheme of Haier washing machine reduces the paper consumption by 90% and the defect rate of appearance damage decreases by 70%. The total switch of transparent packaging in the washing industry is expected to reduce the use of 560,000 tons of base paper every year, that is, reduce the use of 1.74 million m³ wood, equivalent to reducing the felling of 37,500 hectares of trees. Under the influence of Haier's washing industry, the company promoted the introduction of transparent packaging to transparent packaging and air conditioning industries, which is equivalent to reducing deforestation by 162,600 hectares every year and achieving the goal of sustainable development.

The visual and transparent packaging project reduces the consumption of paper, reduces adverse losses, achieves sustainable development and loss reduction, responds to the policy of resource conservation and environmental protection, follows the concept of green, circular and low-carbon development, and supports Goal 12: Responsible consumption and production and Goal 13: climate action.

Project leverage potential

Developed the matching process of "factory batch heat shrinkable film + after-sales cold stretch casing film", established the standard of transparent packaging film "Haier Washing machine heat shrinkable film Enterprise Standard" and "Haier Washing machine cold stretch casing film Enterprise Standard". At present, it has been implemented in Chongqing washing machine factory and Tianjin washing machine factory respectively, and plan to promote the method to refrigerators, freezers, wine cabinets and other product series.

Picture/Image describing the project

Insert picture/and visual graphic here

