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Fine bubble technology — Cleaning applications

Part 4: Test method for oil removal from polyester-based textile

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National foreword

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

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Introduction

In recent years, the market has witnessed a proliferation of new products using fine bubble technology. In the field of textile industry, the introduction of fine bubbles can bring many interesting effects. Using fine bubbles can increase the cleaning efficiency by removal of the residual surface oil of textile in large-scale manufacturing in order to improve the quality of dyeing and finishing process. Especially, polyester-based textile takes very important role in the textile industry since its outstanding features. In addition, fine bubble washing is a physical cleaning method which can reduce the pollution of detergent to the water environment. So, it is needed to design a general test method, for textile manufacturers and related researchers, to evaluate the cleaning efficiency by removal of fine bubble water on polyester-based textile.

In order to adapt to complex usage scenarios in large-scale textile manufacturing, the proposed method uses the mass fraction of oil on polyester-based textile after and before washing to characterize the cleaning effect, and uses ISO brightness (R457)[1] to assist in expressing the degree of cleanliness. To demonstrate, a lubricant, whose main composition is high molecular hydrocarbon, is used as an identical contaminant in production, and an edible oil, whose main composition is fatty acid, is used as an identical contaminant in daily washing. The method is simple, reproducible and highly versatile.

With this method, the oil removal ability of fine bubble water with different bubble sizes and concentrations can be compared. Furthermore, it will further promote the civil and industrial application of oil removal from textile of fine bubbles, for example, washing during fabric recycling process or cleaning with less detergent.

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Fine bubble technology — Cleaning applications —

Part 4: Test method for oil removal from polyester-based textile

1 Scope

This document specifies a test method to evaluate the oil removal performance from polyester-based textile with fine bubbles.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

No terms and definitions are listed in this document.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

4 Principle

In the textile industry, various types of manufacturing machines use different kinds of oils, surfactants and detergents. During the production either the oils are coated over the whole surface of the strings uniformly or the whole surface of the textile in different processes. To test the removal ability, identical samples should be used, e.g. always to use polyester-based textile, for better comparative consistency in the method.

The test method consists in determining the mass fraction of oil on a textile sample before and after cleaning. A weighed polluted sample is soaked in the circulated bubble water. To evaluate the degree of cleanliness, the mass fraction of residual oil on the sample is determined, and the brightness according to ISO[1],[2] is also evaluated.

5 Test methods

5.1 Equipment and material

5.1.1 Drying Oven

Figure 1 shows the drying oven's appearance. The power is 4 kW, and the working temperature range is approximately +10 °C to 250 °C with ±1 °C accuracy.

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