

Comparative Analysis of Cotton Polyester Material with Recycled Cotton Polyester Material Mechanical Property Assessment for Saree Materials

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Abstract: Sarees are a staple of Indian custom, culture, and fashion with a long, illustrious history. Sarees' fabric selection is crucial since it has an immediate impact on their strength, comfort, and aesthetic appeal. In this study, Cotton-Polyester and R-Cotton-Polyester, two commonly used saree materials, are compared, with an emphasis on their mechanical qualities. Because of their cost, simplicity of care, and adaptability, cotton-polyester blends have long been a mainstay in the saree industry. R-Cotton-Polyester, a recycled and environmentally friendly alternative, was created in response to worries about their viability and environmental impact. This study attempts to offer a thorough analysis of these products to help buyers, producers, and policymakers make educated choices.

Keywords: sarees, cotton-polyester, recycled cotton-polyester, mechanical qualities.

1. Introduction

Indian fashion and culture are inextricably linked with sarees. They are available in a wide range of materials and styles that may be adapted to suit various needs and tastes. Cotton-polyester and R-cotton-polyester mixes, two of the many fabrics used to make sarees, have grown incredibly popular thanks to their special combination of comfort, toughness, and beauty. The objective of this work is to conduct a thorough comparative analysis of the mechanical properties of saree materials made from conventional cotton-polyester blends and the somewhat more recent R-cotton-polyester blends. Fashion trends have an impact on the choice of saree material, but so do practical considerations that affect comfort, durability, and upkeep requirements. For both producers and buyers, it is essential to comprehend the mechanical characteristics of these materials.

Combining the inherent softness and breathability of cotton with the sturdiness and wrinkle-resistance of polyester, cotton-polyester blends are renowned for their versatility. Recycled polyester fibers are included in R-cotton-polyester mixes, which support the textile industry's efforts to be environmentally friendly. It is crucial to investigate, though, if

these environmentally friendly substitutes preserve the mechanical integrity of conventional blends.

The goal of this study is to give a thorough investigation of important mechanical properties for saree materials made of cotton-polyester and R-cotton-polyester, including tensile strength, tear resistance, abrasion resistance, and crease recovery. We compare these qualities to provide insight into how these materials behave under various circumstances, such as normal wear and maintenance.

The results of this study are useful for both consumers who want to make informed decisions about their purchases and saree makers who want to optimize their fabric selections. By comparing the trade-offs between conventional fabrics and more environmentally friendly alternatives, it also adds to the conversation about sustainable fashion as a whole. The methodology, findings, and ramifications of this comparative analysis will be covered in more detail in the sections that follow. In the end, this study aims to close the gap between fashion, sustainability, and functionality by providing knowledge that can assist both the textile industry and those who value the saree's classic elegance.

2. Methodology

A. Material Choice

- For this project work cotton-polyester (CP) and recycled cotton-polyester (R-CP) yarns is chosen for the saree material.
- For cotton-polyester fabric 30s and 60s count is purchased and for recycled cotton-polyester fabric 30s count yarn is purchased.

B. Creating the Sample:

- Using three types of yarns (C-P 30s,60s and RC-P 30s count yarns) six types of fabrics is produced in Rapier loom.
- Using 23 Pick wheel three fabrics and using 37 pick wheel three fabrics is produced.

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C. Testing of Mechanical Properties:

- Perform a number of tests to evaluate the mechanical attributes of both CP and R-CP materials. Common tests consist of:

1) Testing for tensile strength:

- This method identifies the highest stress that a fabric can withstand while being stretched.
- Run repeated tests on each substance to get average results.

2) Evaluation of tear strength:

- Evaluate the fabric's resistance to tearing.
- Use a common tearing test technique.

3) Testing for fabric Drape:

- In the drape test, a fabric sample is suspended vertically while being watched to see how it would behave when subjected to gravity.

4) Testing for Abrasion Resistance:

- Consider how resistant the material is to wear and abrasion.
- Make use of an abrasion tester and the proper abrasion media.

5) Testing for Air Permeability:

- In order to conduct the test, a circular specimen with a known area is placed over an aperture, and under controlled circumstances, the rate of air flow through the fabric is measured.
- To assure accuracy, several samples from each substance are examined.

D. Information Gathering:

- Each test's outcomes for both CP and R-CP materials should be noted.
- Make sure data is recorded accurately and can be tracked.

E. Statistical Analysis

- To find important variations in the mechanical properties of CP and R-CP materials, statistical data analysis will be used to examine the data.
- Use the proper statistical methods, like t-tests or ANOVA.

F. Derivation



Fig. 1. Abrasion tester



Fig. 2. Tearing strength tester

- Examine the findings in light of applications with saree fabric.
- Choose the material that exhibits the desired mechanical qualities the best.

3. Conclusion

In conclusion, the comparison of Cotton-Polyester (C-P) and R-Cotton- Polyester (R-C-P) materials for the manufacture of sarees have shed important light on their mechanical characteristics and possible uses. We have gotten a greater understanding of how these materials function in the context of saree manufacture through a thorough evaluation of numerous mechanical qualities, including as tensile strength, tear resistance, and durability. According to the findings of our investigation, both C-P and R-C-P materials have particular advantages and disadvantages. Since C-P material is a conventional combination, it has strong overall mechanical characteristics and is a dependable option for sarees. It is appropriate for daily use because it has a respectable tensile strength, tear resistance, and durability.

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