



Faculty of Engineering

Department of Textile Engineering

TITLE OF THE PROJECT

“Identification of the suitable properties of accessories used in washed garments, problems arise for wrong accessories and their remedies.”

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**This Report Presented in Partial Fulfilment of the Requirements
for the Degree of Bachelor of Science in Textile Engineering.**

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DECLARATION

We hereby affirm that the research presented in this thesis, titled ‘Identification of Appropriate Properties for Accessories Used in Laundered Garments: Addressing Issues Arising from Incorrect Accessories and Their Remedies, is entirely our original work. It has not been submitted to any university for consideration for any other academic degree. Additionally, we properly credit and recognize all the materials and resources that were used to prepare this thesis.

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This research entitled “Identification of the suitable properties of accessories used in washed garments, problems arise for wrong accessories and their remedies” “**at Daffodil International University, March 2024**” prepared and submitted by **Mahbub Hassan Mobin (ID:201-23-944) & SHAKHAWAT ULLAH (ID:201-23-932)** in partial fulfillment of the requirement for the degree of BACHELOR OF SCIENCE IN TEXTILE ENGINEERING has been examined and at this moment recommended for approval and acceptance.



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Dedication

We dedicate this report to **Abdullah Al Mamun** Sir for his assistance in finishing this assignment and to our parents for allowing us to study textile engineering.

Abstract:

The selection of appropriate accessories is vital in the textile industry to ensure the quality, functionality, and longevity of textile products. However, the improper selection or use of accessories can lead to various problems such as compromised durability, diminished aesthetic appeal, and non-compliance with regulatory standards. This thesis investigates the key properties that make accessories suitable for different textile applications, analyzes the problems that arise from using incorrect accessories, and proposes remedial measures to address these issues. Through a comprehensive review of literature, case studies, and empirical analysis, this study aims to provide valuable insights into the importance of accessory selection and offer practical recommendations for mitigating problems associated with the use of wrong accessories in the textile industry.

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CHAPTER-1

INTRODUCTION

1.1: Background of this project

The background of the proposed project on the identification of suitable properties of textile accessories, the problems arising from using the wrong accessories, and their remedies stems from several key factors and considerations within the textile industry:

1.1.1: Growing Importance of Textile Accessories: With the increasing demand for textile products across various sectors such as fashion, home textiles, automotive, and industrial applications, the significance of textile accessories has surged. These accessories not only contribute to the functionality and durability of the final products but also play a crucial role in enhancing their aesthetic appeal and user experience.

1.1.2: Complexity in Textile Supply Chains: The textile industry operates within complex global supply chains, often involving multiple suppliers, manufacturers, and distributors. This complexity introduces challenges in ensuring the quality and compatibility of accessories sourced from different regions and suppliers, making it essential to establish robust quality assurance processes.

1.1.3: Rising Consumer Expectations: In today's consumer-driven market, customers have heightened expectations regarding product quality, performance, and safety. Any issues related to the misuse of textile accessories can lead to dissatisfaction, negative reviews, and even legal repercussions, necessitating thorough attention to detail in accessory selection and integration.

1.1.4: Regulatory Compliance and Safety Standards: Textile products are subject to stringent regulations and safety standards, particularly concerning materials, chemicals, and flammability. Failure to adhere to these standards due to the use of the wrong accessories can result in non-compliance penalties, product recalls, and reputational damage for manufacturers and brands.

1.1.5: Continuous Innovation and Improvement: The textile industry is characterized by rapid technological advancements and evolving consumer preferences. Manufacturers must continuously innovate and optimize their processes, materials, and designs to stay competitive and meet the changing demands of the market.

Given these factors, the proposed project aims to address the critical need for a comprehensive understanding and management of textile accessories' properties. By conducting thorough research, identifying potential problems, and offering effective remedies, the project seeks to empower manufacturers and stakeholders in the textile industry to enhance product quality, reliability, and customer satisfaction while mitigating risks and ensuring regulatory compliance.

1.2: The objective of this project

- ❖ Comprehensive Understanding of Accessory Properties:
- ❖ Risk Assessment and Problem Identification:
- ❖ Impact on Product Quality and Brand Reputation
- ❖ Development of Remedial Strategies
- ❖ Guidelines for Accessory Selection:
- ❖ Promotion of Regulatory Compliance
- ❖ Knowledge Dissemination and Industry Education:
- ❖ Encourage Continuous Improvement and Innovation
- ❖ Understanding Root Causes
- ❖ Proposing Remedial Measures
- ❖ Validation and Testing
- ❖ Documentation and Dissemination
- ❖ Facilitating Knowledge Transfer

1.3: Importance of this project

The importance of the project on the identification of suitable properties of textile accessories, problems arising from using the wrong accessories, and their remedies is underscored by several key factors within the textile industry and broader societal contexts:

1.3.1: Enhanced Product Quality and Performance: The project addresses the fundamental goal of improving the quality and performance of textile products. By identifying and incorporating suitable properties in accessories, manufacturers can produce textiles that meet or exceed consumer expectations, leading to increased customer satisfaction and loyalty.

1.3.2: Consumer Safety and Satisfaction: The correct selection of textile accessories is crucial for ensuring the safety and well-being of consumers. By addressing potential issues related to wrong accessories, the project contributes to the production of textiles that comply with safety standards, reducing the risk of harm to end-users.

1.3.3: Risk Mitigation and Brand Protection: Misuse of accessories can lead to various risks, including product defects, recalls, and damage to brand reputation. The project provides strategies to mitigate these risks, protecting manufacturers and brands from financial losses and reputational harm.

1.3.4: Regulatory Compliance and Legal Conformity: As the textile industry is subject to stringent regulations and standards, adherence to these requirements is imperative. The project emphasizes the importance of regulatory compliance, helping manufacturers avoid legal issues and ensuring that their products meet the necessary standards.

1.3.5: Global Supply Chain Optimization: In an industry with complex global supply chains, the project encourages collaboration with reputable suppliers and the establishment of quality assurance procedures. This optimization can lead to a more efficient and reliable supply chain, reducing disruptions and enhancing overall production processes.

1.3.6: Industry Competitiveness and Innovation: Manufacturers that consistently produce high-quality textiles gain a competitive edge in the market. The project promotes continuous improvement and innovation, encouraging industry players to stay ahead of trends, adopt new technologies, and meet evolving consumer demands.

1.3.7: Sustainable Practices: The project indirectly contributes to sustainability by promoting the use of appropriate accessories that enhance product durability. Extending the lifespan of textiles through proper accessory selection aligns with sustainability goals by reducing the environmental impact associated with frequent replacements and disposals.

1.3.8: Educational Impact: By disseminating knowledge and guidelines, the project serves as an educational resource for industry professionals, manufacturers, and stakeholders. Increased awareness and understanding of the importance of accessory properties can lead to more informed decision-making and practices within the industry.

1.3.9: Consumer Confidence and Trust: A focus on the identification of suitable accessory properties instills confidence and trust in consumers. When consumers are assured of the quality, safety, and durability of textile products, they are more likely to make informed purchasing decisions and develop positive perceptions of brands.

In summary, the importance of this project lies in its potential to elevate the textile industry by improving product quality, ensuring consumer safety, mitigating risks, and fostering innovation. Ultimately, the project aims to contribute to a more resilient, competitive, and responsible textile manufacturing ecosystem.

1.4 Aim of this project

The aim of this project is to reduce the accessories related fault, know about the suitable properties of accessories, problems arise for using wrong accessories and their remedies.

1.5 scope of this project

Scope of the Project: The project on the identification of suitable properties of textile accessories, problems arising from using the wrong accessories, and their remedies encompasses various dimensions within the textile industry. The scope of the project includes, but is not limited to, the following aspects:

1.5.1: Research and Documentation: Conduct comprehensive research to identify the essential properties of textile accessories across different categories, such as buttons, zippers, ribbons, and elastics. Documenting the properties relevant to functionality, durability, aesthetics, comfort, and safety.

1.5.2: Problem Identification: Analyzing potential challenges and problems that arise from the misuse or selection of inappropriate textile accessories. Identifying common issues related to product quality, functionality, safety, and user satisfaction caused by wrong accessories.

1.5.3: Impact Assessment: Assessing the impact of using wrong accessories on product quality, brand reputation, consumer safety, and regulatory compliance. Evaluating the consequences of accessory-related problems on manufacturers, brands, and end-users.

1.5.4: Remedial Strategies: Developing effective remedies and solutions to address identified problems. Proposing strategies such as quality assurance procedures, supplier collaboration, product testing and certification, and continuous improvement initiatives in accessory materials and designs.

1.5.5: Guideline Development: Formulating guidelines and best practices for the selection, integration, and quality assurance of textile accessories. Providing guidance tailored to different types of products, materials, manufacturing processes, and end-user requirements.

1.5.6: Regulatory Compliance: Emphasizing the importance of complying with relevant regulations and safety standards in accessory selection and integration. Providing insights into regulatory requirements and facilitating compliance to avoid legal issues and ensure consumer safety.

1.5.7: Knowledge Dissemination: Disseminating research findings, guidelines, and remedial strategies to industry professionals, manufacturers, suppliers, and stakeholders. Promoting education and awareness about the critical role of textile accessories in product quality and consumer satisfaction.

1.5.8: Continuous Improvement: Encouraging a culture of continuous improvement and innovation in the selection and utilization of textile accessories. Highlighting the significance of staying updated with industry trends, technological advancements, and consumer preferences.

1.5.9: Collaboration and Engagement: Facilitating collaboration and knowledge sharing among industry stakeholders, academia, research institutions, and regulatory bodies. Encouraging dialogue and exchange of ideas to address common challenges and drive collective progress in the textile industry.

1.5.10: Practical Implementation: Providing practical insights and tools for implementing the recommended strategies and guidelines in real-world manufacturing settings. Supporting manufacturers in adopting best practices and enhancing their capabilities in accessory selection and integration.

Overall, the scope of the project encompasses a holistic approach to improving product quality, safety, and competitiveness within the textile industry, while also promoting sustainability, innovation, and regulatory compliance.

1.6: Limitations of this project

While the thesis outlined above aims to address significant issues surrounding the selection and use of textile accessories, it's essential to acknowledge several limitations that may impact the scope and generalizability of the project:

1.6.1: Scope Limitations: The thesis may focus primarily on certain types of textile accessories or specific applications, potentially overlooking the broader range of accessories and their diverse uses in the textile industry.

Due to the complexity of accessory selection and usage, it may not be feasible to cover every possible scenario or combination of factors influencing accessory performance comprehensively.

1.6.2: Data Availability: Limited availability of comprehensive and standardized data on accessory properties, performance, and industry practices may constrain the depth of analysis and empirical validation in the thesis.

Access to proprietary information from industry stakeholders, including manufacturers and suppliers, may be restricted, hindering the ability to conduct detailed case studies or gather firsthand insights.

1.6.3: Time and Resource Constraints: Time and resource constraints may limit the extent of empirical research, data collection, and analysis, potentially leading to gaps in understanding or insufficient evidence to support findings and recommendations.

Conducting extensive field studies or longitudinal research to assess the long-term effects of accessory selection may be impractical within the timeframe of the project.

1.6.4: Subjectivity and Bias: The interpretation of findings and recommendations may be influenced by the researcher's perspectives, biases, or expertise in the field, potentially leading to subjective judgments or limited objectivity in the analysis.

Bias may also arise from the selection of case studies, participants, or sources of information, impacting the validity and reliability of conclusions drawn in the thesis.

1.6.5: External Factors: External factors such as changes in market trends, technological advancements, regulatory requirements, or global events (e.g., economic fluctuations, pandemics) may influence the relevance and applicability of the thesis findings over time. Unforeseen challenges or disruptions in the supply chain, manufacturing processes, or industry practices could affect the implementation of remedial measures proposed in the thesis.

1.6.6: Validation and Generalizability: The generalizability of findings and recommendations may be limited by the context-specific nature of the study, including the characteristics of the sample population, geographical location, or industry segment. Validation of remedial measures or best practices proposed in the thesis may require further empirical testing or validation in diverse settings to assess their effectiveness and applicability across different contexts.

Despite these limitations, addressing these challenges transparently and acknowledging their potential impact on the project's outcomes can enhance the credibility and reliability of the thesis findings. Additionally, highlighting avenues for future research and collaboration can help mitigate some of these limitations and foster continuous improvement in the field of textile accessory selection and usage.

Chapter 2

Literature Review

2.1: Previous Study

In the 7th semester of spring 2023, we have completed Apparel Manufacturing 4, Apparel Manufacturing 3, and Textile Testing and Quality Control 3. In Apparel Manufacturing 4 we have learned about Accessories. From Apparel Manufacturing 3 we have learned about garment washing and from the textile testing and quality control course we know about testing. Then I thought about suitable properties of accessories used in washed garments. How to make it more comfortable and durable.

2.2: What is accessories

The fabric is the main component of garments. To make a garment more convenient and attractive, some other materials are used along with the fabric. To serve the basic functions and for decorative purposes, these materials are required. Collectively they are called garment accessories.

Therefore, garment accessories are the materials that are used along with the main body fabric to serve the full purpose. Button, Zipper, Thread, Label, etc. are some main garments accessories.

2.3: Main Functions of Garment Accessories

Accessories are used to serve different functions of a garment. Some of the functions are given below:

- ❖ Garment accessories sometimes act as decorative material.
- ❖ Accessories can make a garment more suitable to wear.
- ❖ Accessories are used to make the garments more flexible.
- ❖ Accessories help to ensure the garment's durability.
- ❖ To fulfill customer demand different accessories are used.

2.4: Types of Accessories & Trimmings

Textile accessories play a vital role in the production, embellishment, and finishing of textile products. They contribute to both the functionality and aesthetics of various textile items across different industries. Here are some common types of accessories used in textiles:

2.4.1: Fasteners:

- ❖ Zippers: Used for opening and closing garments, bags, and other textile products.
- ❖ Buttons: Provide a means of fastening garments and adding decorative accents.
- ❖ Snaps: Quick and convenient closures commonly used in clothing and accessories.
- ❖ Hooks and Eyes: Provide secure closures for garments, particularly at the neckline and waistline.
- ❖ Velcro: Hook-and-loop fasteners used for adjustable closures and attachments.



2.4.2: Trims and Embellishments

- ❖ Ribbons: Decorative bands often used for edging, binding, or embellishing textiles.
- ❖ Lace: Intricate fabric with openwork patterns, commonly used for decorative purposes in garments and home textiles.
- ❖ Braids: Decorative cords or strips used for edging, piping, or embellishment.
- ❖ Sequins: Small, shiny embellishments attached to textiles for decorative purposes, commonly used in fashion and costume design.
- ❖ Patches: Fabric pieces embroidered or printed with designs, logos, or slogans, often used for branding or personalization.
- ❖ Beads: Small, decorative objects attached to textiles for ornamental purposes, commonly used in jewelry and apparel embellishment.



2.4.3: Labels and Tags:

- ❖ Brand Labels: Tags or labels displaying the brand name, logo, and other branding information.
- ❖ Size Labels: Tags indicating the size of the garment or textile product.
- ❖ Care Instruction Labels: Labels providing instructions for washing, drying, ironing, and other care procedures.



- ❖ Hang Tags: Tags attached to garments or textiles for branding, pricing, or promotional purposes.
- ❖ RFID Tags: Radio-frequency identification tags used for tracking and inventory management.



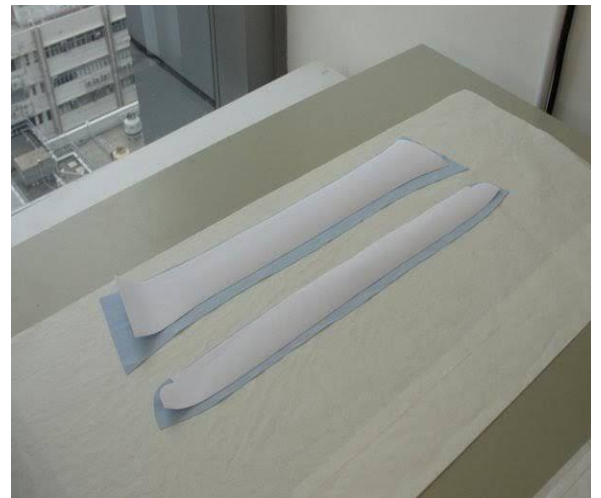
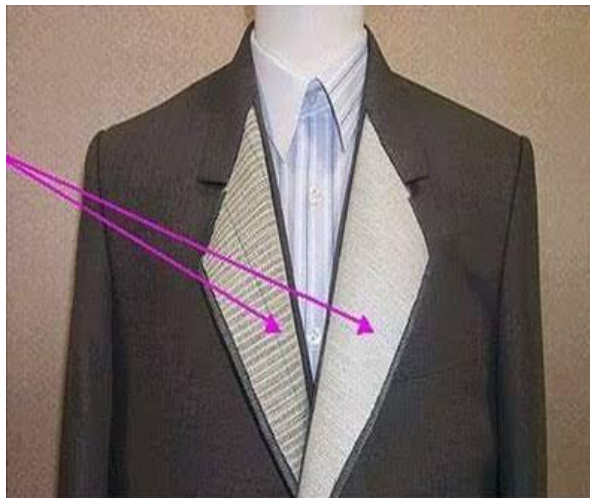
2.4.4: Threads and Yarns:

- ❖ Sewing Threads: Threads used for stitching and sewing fabrics together, available in various materials and thicknesses.
- ❖ Embroidery Threads: Threads used for decorative stitching and embroidery, often available in a wide range of colors and textures.
- ❖ Elastic Threads: Stretchable threads used for creating gathers, smocking, or providing stretch in garments and accessories.
- ❖ Decorative Yarns: Specialty yarns used for embellishing textiles through techniques such as weaving, knitting, or crochet.



2.4.5: Interlinings and Linings:

- ❖ Fusible Interlinings: Fabrics coated with adhesive on one side, used for adding structure and support to garments.
- ❖ Non-Fusible Interlinings: Interfacing materials that provide shape and reinforcement to garment areas such as collars, cuffs, and waistbands.
- ❖ Lining Fabrics: Fabrics used to line the interior of garments for comfort, opacity, and protection.



2.4.6 Elastics and Tapes:

- ❖ **Waistbands:** Elastic bands used in the waist area of garments to provide flexibility and comfort.
- ❖ **Cords:** Flexible, cylindrical strands used for drawstrings, ties, or piping.
- ❖ **Drawstrings:** Strings used to tighten or cinch the waist, cuffs, or hems of garments.
- ❖ **Binding Tapes:** Fabric strips used to finish edges, seams, or hems neatly and securely.



2.4.7: Buttons and Buckles:

- ❖ **Shirt Buttons:** Small, round buttons used for shirt fronts, cuffs, and collars.
- ❖ **Coat Buttons:** Larger buttons used for outerwear garments such as coats and jackets.
- ❖ **Buckles for Belts:** Metal or plastic fasteners used for adjusting the fit of belts and straps.
- ❖ **Buckles for Bags:** Sturdy closures used for securing the openings of bags, purses, and luggage.

2.4.8: Hangers and Packaging:

- ❖ Garment Hangers: Wire, plastic, or wooden structures used for hanging and displaying garments in retail stores or closets.
- ❖ Polybags: Plastic bags used for packaging and protecting garments during storage and transportation.
- ❖ Boxes: Cardboard or plastic containers used for packaging textile products such as shoes, hats, or accessories.
- ❖ Tissue Paper: Thin paper used for wrapping delicate textiles or providing cushioning within packaging.



These accessories, among others, are essential components of textile products, contributing to their functionality, appearance, and branding. Manufacturers carefully select and integrate accessories into their designs to enhance the overall quality and appeal of their textile offerings.

2.5: Accessories used in washed garments

Accessories used in washed garments are similar to those used in non-washed garments, but their selection and application may vary depending on the desired aesthetic effects and finishing techniques. Here are some common accessories specifically used in washed garments:

2.5.1: Labels and Tags: Just like in non-washed garments, labels and tags are essential for providing information about the garment, including brand identity, size, care instructions, and pricing. However, in washed garments, these labels and tags may undergo special treatments to ensure they maintain their appearance after washing, such as printing on durable materials or using water-resistant inks.

2.5.2: Buttons and Fasteners: Buttons, zippers, snaps, and other fasteners used in washed garments must be durable and resistant to corrosion or fading caused by washing. Manufacturers may choose materials like metal or plastic with special coatings or finishes to enhance their longevity and appearance after repeated wash cycles.

2.5.3: Threads: Threads used in washed garments should be strong and colorfast to withstand the rigors of washing without fading or unraveling. Additionally, threads may be selected to complement the garment's washed or distressed aesthetic, such as using contrasting or tonal thread colors for decorative stitching.

2.5.4: Trims and Embellishments: Trims and embellishments in washed garments may undergo special treatments to achieve desired distressed or worn effects. For example, lace, ribbons, and other trims may be subjected to stone washing or enzyme washing to soften their appearance and blend seamlessly with the garment's overall look.

2.5.5: Labels and Patches: Brand labels, woven labels, and embroidered patches in washed garments may undergo pre-washing treatments to achieve a vintage or worn-in appearance. This may involve distressing techniques such as sandblasting, grinding, or brushing to soften edges and create a weathered look.

2.5.6: Hardware: Metal hardware, such as rivets, studs, and grommets, used in washed garments may be treated with special finishes or coatings to prevent rusting or corrosion caused by exposure to water and detergents during washing.

2.5.7: Specialty Finishes: Some washed garments may feature specialty finishes applied to accessories, such as metallic coatings, patinas, or antiquing effects, to enhance their aged or distressed appearance.

2.5.8: Packaging Materials: Packaging accessories for washed garments may include water-resistant or tear-resistant materials to protect the garment during transit and storage. Additionally, eco-friendly packaging options may be preferred to align with sustainability goals.

These are just a few examples of the accessories used in washed garments, highlighting the importance of selecting materials and finishes that can withstand the unique challenges posed by washing processes while achieving the desired aesthetic effects.

2.6: Properties of accessories used in textile

properties needed for accessories in RMG

Accessories used in the ready-made garment (RMG) industry require specific properties to ensure they enhance the functionality, aesthetics, and quality of the garments they **2.6 2.6.1** accompany. These properties vary depending on the type of accessory and its intended use. Here are some key properties needed for accessories in RMG:

2.6.2: Durability: Accessories must be durable enough to withstand the rigors of garment production, transportation, and use by consumers. This includes resistance to tearing, breaking, fraying, or fading over time.

2.6.3: Colorfastness: Accessories should maintain their color integrity even after exposure to washing, sunlight, or other environmental factors. This ensures that they do not bleed or transfer color onto the garment, preserving its appearance.

2.6.4: Compatibility: Accessories must be compatible with the materials and construction techniques used in the garment. For example, buttons and fasteners should securely attach to fabric without causing damage or distortion.

2.6.5: Safety: Accessories should meet safety standards to ensure they do not pose any hazards to consumers. This includes avoiding sharp edges, choking hazards, or chemical residues that could cause skin irritation or allergic reactions.

2.6.6: Ease of Application: Accessories should be easy to apply or attach to the garment during production. This includes features such as pre-punched holes for buttons, adhesive backing for patches, or snap-on fasteners for trims.

2.6.7: Comfort: Accessories that come into contact with the skin, such as labels or linings, should be comfortable to wear and not cause irritation or discomfort.

2.6.8: Customizability: Accessories should be customizable to meet the branding and design requirements of the garment. This may involve options for personalized labels, custom colors, or unique embellishments.

2.6.9: Environmental Sustainability: There is increasing demand for accessories that are produced using environmentally sustainable materials and manufacturing processes. This includes using recycled materials, reducing waste, and minimizing the environmental impact of production.

2.6.10: Cost-effectiveness: Accessories should be cost-effective for manufacturers while still meeting quality and performance standards. This may involve sourcing materials from reliable suppliers, optimizing production processes, and minimizing waste.

By ensuring that accessories possess these properties, manufacturers can enhance the overall quality, appeal, and functionality of ready-made garments while meeting consumer expectations and industry standards.

Chapter 3

Methodology

3.1: Different Trims and Accessories Inspection in the Apparel Industry Labeling / Printing / Marking (Data Collected From Laundry Industries Ltd. (Envoy Group) and Rotex Bangladesh Ltd.)

Compare the requirements concerning the approved layout and country-specific requirements. Labels/hangtags should cover the following: Care instructions, RN number/CA number, Country of Origin, Fiber Content, Size, Barcode, UPC Code, Retail Price, etc.

3.1.1: Country of origin

For the countries like USA, Canada, Mexico, Australia, & Japan the country of origin must and should be attached to the product permanently. Country of origin should be on the front side of the product, permanent, legible, and may be printed both on the product and packaging.

3.1.2: Fiber content

For most of the importing countries, like the USA, Canada, Australia, Japan, the UK, Germany, and European countries fiber content is mandatory. Each fiber content should be declared with percentages and the fiber content less than 5% can be stated as other fibers. If the product consists of two or more fibers and is more than 5% then each fiber's content should be declared in % values.

3.1.3: Care Label Inspection

Some important items are to be checked on the care label. The care label inspection should include Language Fiber Content, Country of Origin, Care Manufacturer or Importers business name RN Number or CA Number, and Size.

3.1.4: Label/tag check: Label/tag should be checked in the following steps.

- ❖ Check if it is correct according to the buyer and style.
- ❖ Check the color of the label and tag.
- ❖ Label & tag size.
- ❖ Check the wording layout of the label & tag.
- ❖ Need to check the reference number.
- ❖ Check the color bleeding of the label.
- ❖ Check whether any type of writing is missing or obscure in the label & tag.
- ❖ The label and tag should be checked for any damage or cracking.

3.1.5: Sewing thread check

- ❖ The sewing thread should be checked in the following steps.
- ❖ Thread count
- ❖ Thread elongation
- ❖ Thread balance
- ❖ Number of twists
- ❖ Color matching
- ❖ Shade number check
- ❖ Shade check
- ❖ Thread tenacity
- ❖ Thread ply

3.1.6: Elastic check

- ❖ Elastic should be checked in the following steps.
- ❖ 10% elastic should be checked or according to the buyer's instruction.
- ❖ Check according to the lot & save the report.
- ❖ Check the color, thickness, and width of the elastic.
- ❖ Must see the measurement.
- ❖ Color bleeding checked by wash.
- ❖ Measure along with the size of the elastic with the large size of the garments.
- ❖ Elastic rejection calculation method: Say that large-size garments are elastic 50 cm. Then check every 50 cm interval. For every defect within 50 cm, a 50 cm defect must be calculated. The defect percentage must be determined by taking out the complete defect gauge/meter.

3.1.7: Tape check system

- ❖ 10% tape should be checked or checked according to buyer instructions.
- ❖ Check according to the lot & save the report.
- ❖ Check tape color, thickness, and width.
- ❖ Check measurement.

3.1.8: Shade check.

- ❖ Check color bleeding by washing.
- ❖ Check for any kind of damage on the tape.
- ❖ Need to keep the report.

3.1.9: Button, Snap/Popper, and metal item check

- ❖ Check button thickness
- ❖ Check buttonhole quantity
- ❖ Check color
- ❖ Check measurement
- ❖ Must be done pull test
- ❖ Metal items are checked by a metal detector machine.
- ❖ Should be done nickel test for metal items.
- ❖ Check if there is any damage or the broken present.
- ❖ Need to keep the report.

3.1.10: Heat seals (HTS) Inspection

- ❖ Collect technical data sheets according to style.
- ❖ Machine temperature, time & pressure are set according to the datasheet.
- ❖ Heat seal color, measurement, and wording should be checked for accuracy.
- ❖ Check if the heat seal is obscure or if there is any damage or cracking.
- ❖ See if there is any missing letter or if it is floating.
- ❖ It remains to be seen whether the heat seal will rise after attachment.
- ❖ The wash test should be done to make sure that there is no change after heat seal wash.
- ❖ Need to keep the report.

3.1.11: Zipper Inspection

- ❖ Check zipper color & shade are correct.
- ❖ Check that every element of the zipper is correct.
- ❖ Measurement should be checked for accuracy.
- ❖ Metal detectors pass & a nickel test should be done for the metal zipper.
- ❖ Check if there is any damage or broken present.
- ❖ Need to keep a record.
- ❖ Other Material: Other materials like poly, carton, hanger, Interlining, fusing, anti-mold agent, etc. should be checked against the approved layout. Ensure the printing layout, size, and quality, or if there is any damage present.

3.1.12: In-house Testing of Trims and Accessories in the Apparel Industry

Testing should be completed within 72 hours after receiving trims & accessories

For in-house testing collect approved trims cards & relevant documents from the merchandiser, through which the quality department will meet the customer demand.

Collect supplier inspection report at the time of trims & accessories received.

Trims and Accessories Inspection and testing should be done according to lot/batch.

Every test failure will be considered a critical defect and in that case, the acceptance is zero.

In case of testing failure, inform the concerned merchandising department & supplier, then take the necessary steps.

3.1.13: Moisture Check

The moisture of trims & accessories should be measured, if moisture content exceeds the allowable limit, then those trims and accessories should be returned to the supplier for reprocessing. Lot-wise 03 pieces of trims & accessories moisture should be checked.

3.1.14: Trims & Accessories DTM wash test

Attach all materials of that style to a piece of white fabric of any style and wash it according to the prescribed wash standard of that style. The DTM test makes sure that there is no change of shade or color after washing or if there is any discoloration. DTM test should be maintained per style & color 01 set.

3.1.15: Metal items nickel test

Nickel test should be maintained lot-wise, a minimum of 03 sets should be tested per lot. Moisten a cotton swab with two drops of each solution (ammonia & dimethylglyoxime). It must be exactly two drops of each solution and not more or less. It does not matter which chemical is added first, but the two chemicals shall be mixed on the cotton swab. Rub quite hard on the area to be tested for 30 seconds, not shorter and not longer. Use a clock that shows seconds. The appearance of pink color, from light pink to strong cerise indicates nickel release. Other colors, green, grey, brown, or blue indicate other metals or dirt: in these cases, the sample is OK.

3.1.16: Button/Popper/Snap Pull Test

Pull tests should be done by making mock-ups according to the approved sample. Pull tests are usually performed at 90 newtons and are followed if the customer has different demand. Should be maintained lot-wise test, minimum 03 sets should be tested per lot.

3.1.17: Metal detection

A metal detector passes to ensure if there is any contaminated metallic substance inside the trims & accessories. 100% metal accessories (snap, button, zipper, etc.) should pass through the metal detector machine.

3.1.18: Elastic recovery & pre-shank test

Recovery test: The recovery test checks whether the elastic returns to its previous position after expansion. In this test usually 60 cm elastic cuts and marked 50 cm. Hold on to both ends of elastic & extend double of its measurement for 01 minutes, then release it to return to its previous condition. Then measure & calculate the recovery percentage.

Elastic recovery % = (Before test measurement – After test measurement)/before measurement x100.

Pre-shank Test: This test tested elastic shrinkage. This test usually cut 60 cm elastic & marked 50 cm. Then the elastic is washed and ironed. Then the amount of shrinkage is determined.

Elastic pre-shank%= (Before wash measurement – After wash measurement)/before wash x 100

Elastic recovery & pre-shank should be checked lot-wise one piece.

3.1.19: Zipper lateral resistance test

This test tested the strength of zipper tape. Zipper tape should be pulled side by side with equal pressure. Hold the zipper tape at a 90-degree angle and apply pressure evenly on both sides. This test tested the zipper strength. Zipper lateral resistance should be tested per lot 03 pieces.

3.1.20: Barcode scanning

Barcode scanning should be performed to ensure that all the information on the UPC code is correct. Per size/type 05 pieces barcode should be scanned from each lot/batch.

Trims and Accessories Inspection and testing are the primary part of quality control that ensures the raw materials used in garments products meet buyer specifications.

3.2: Problems arise from using the wrong accessories

Using improper accessories in clothing can lead to a range of issues that affect the garment's quality, functionality, comfort, and overall appeal. Here are several problems that can arise:

3.2.1: Poor Fit and Functionality:

- ❖ Zippers: Incorrectly sized or low-quality zippers may not zip smoothly or may become stuck, leading to frustration for the wearer and potential damage to the garment.
- ❖ Buttons: Inadequately secured buttons may pop off during wear, causing the garment to come undone and potentially exposing the wearer.
- ❖ Elastic: Improperly sized or low-quality elastic bands may fail to provide adequate stretch, resulting in discomfort or difficulty putting on or taking off the garment.

3.2.2: Safety Concerns:

- ❖ Choking Hazards: Small or detachable accessories such as buttons, beads, or decorative elements can pose a choking hazard, particularly for young children.
- ❖ Sharp Edges: Poorly finished accessories like zippers or metal fasteners with sharp edges may cause scratches or cuts to the wearer's skin.

3.2.3: Durability Issues:

- ❖ **Colorfastness:** Low-quality or improperly dyed accessories such as buttons or trims may bleed onto the garment fabric during washing, causing discoloration and ruining the garment's appearance.
- ❖ **Breaking or Fraying:** Accessories made from weak or brittle materials may break or fray over time, compromising the garment's structural integrity and reducing its lifespan.

3.2.4: Aesthetic Problems:

- ❖ **Mismatched Colors or Styles:** Accessories that clash with the garment's color scheme or style can detract from its overall appearance and diminish its visual appeal.
- ❖ **Inconsistent Quality:** Inconsistent or mismatched accessories across a garment can create a disjointed look and give the impression of poor craftsmanship.

3.2.5: Customer Dissatisfaction:

- **Uncomfortable Wear:** Accessories that irritate the skin or restrict movement can result in discomfort for the wearer, leading to negative reviews and reduced customer satisfaction.
- **Higher Return Rates:** Garments with quality issues caused by improper accessories may experience higher rates of returns and exchanges, resulting in increased costs for the manufacturer or retailer.

To avoid these problems, clothing manufacturers should carefully select accessories that are compatible with the garment's design and intended use, prioritize quality and durability, and adhere to industry standards and regulations. Additionally, thorough testing and quality control measures should be implemented throughout the production process to identify and address any issues before the garments reach the market.

3.3: Remedies of those problems

Addressing problems that arise from using the wrong accessories in textile products requires careful consideration and effective remedies. Here are some common remedies for the issues mentioned:

3.3.1: Poor Fit and Functionality:

- ❖ Zippers
- ❖ Remedy: Use high-quality, properly sized zippers that undergo rigorous testing for smooth operation. Regularly check and maintain zipper functionality during the production process.
- ❖ Buttons:
- ❖ Remedy: Select buttons that are securely attached and appropriately sized for the garment. Reinforce button attachments with additional stitching or use reinforced button styles.
- ❖ Elastics:
- ❖ Remedy: Ensure the correct tension and stretch properties of elastics. Conduct thorough testing on elastic bands to guarantee optimal performance and comfort.

3.3.2: Safety Hazards:

- ❖ -Choking Risks
- ❖ Remedy: Avoid using small or detachable accessories in garments intended for children. Ensure that accessories comply with safety standards and regulations.
- ❖ Sharp Edges:
- ❖ Remedy: Implement proper finishing processes for accessories to eliminate sharp edges. Regularly inspect accessories for any potential safety hazards.

3.3.3: Durability and Performance Issues:

- ❖ Color Bleeding
- ❖ Remedy: Select accessories made from colorfast materials and conduct thorough colorfastness testing. Provide clear care instructions to consumers to minimize the risk of color bleeding.
- ❖ Breakage or Fraying:
- ❖ Remedy: Opt for high-quality accessories made from durable materials. Conduct tensile strength and durability tests on accessories to ensure they meet performance requirements.

3.3.4: Aesthetic Problems:

- ❖ Mismatched Colors or Styles:
- ❖ Remedy: Develop a cohesive design strategy for accessories that aligns with the garment's overall aesthetic. Conduct regular quality control checks to ensure consistency in colors and styles.
- ❖ Inconsistent Quality
- ❖ Remedy: Source accessories from reputable suppliers with consistent quality standards. Establish clear specifications and quality control procedures to maintain uniformity.

3.3.5: Customer Dissatisfaction:

- ❖ Uncomfortable Wear:
- ❖ Remedy: Prioritize comfort in accessory selection. Test accessories for potential irritation or discomfort, and consider alternatives if issues arise.
- ❖ High Return Rates:
- ❖ Remedy: Address quality issues promptly by implementing effective returns and exchange policies. Work closely with suppliers to resolve quality concerns and improve production processes.

3.4: Additional remedies may include:

Supplier Collaboration: Work closely with accessory suppliers to communicate quality requirements and expectations, and collaborate on product development and improvement initiatives.

Continuous Improvement: Regularly review and update product specifications, quality standards, and manufacturing processes to address emerging issues and incorporate lessons learned from previous experiences.

Training and Education: Provide training to employees involved in accessory selection, inspection, and quality control to ensure they understand the importance of using appropriate accessories and identifying quality issues.

Certification and Compliance: Ensure that accessories comply with relevant industry standards, regulations, and certifications to guarantee safety, performance, and environmental sustainability.

By implementing these remedies, textile manufacturers can mitigate the negative effects of using wrong accessories in their products. Additionally, a proactive approach involving continuous improvement, collaboration with suppliers, and adherence to industry standards will contribute to the overall success of the textile production process. Regular monitoring, quality control, and feedback mechanisms will help identify and address issues before they reach the market, ensuring customer satisfaction and brand reputation.

3.5: Different kind of test is required for accessories in RMG

Testing textile accessories is crucial to ensure that they meet quality standards and perform effectively in various applications. The specific tests required for textile accessories depend on their type, function, and intended use. Here are some common tests conducted on textile accessories:

3.5.1: Dimensional Stability Testing: Ensure that accessories such as zippers, buttons, and fasteners maintain their shape and size under different conditions, including washing and stretching.

3.5.2: Strength Testing: Assess the tensile strength and durability of accessories, especially fasteners and elastic components, to ensure they can withstand the stresses encountered during normal use.

3.5.3: Colorfastness Testing: Determine the resistance of colored accessories to factors like washing, light exposure, and rubbing to prevent color bleeding, fading, or transfer onto other fabrics.

3.5.4: Functionality Testing: Verify the functionality of accessories such as zippers, buttons, snaps, and elastic bands to ensure they operate smoothly and securely as intended.

3.5.5: Abrasion Resistance Testing: Evaluate the resistance of accessories to wear and tear through abrasion testing, especially relevant for items like tapes, bands, and fasteners.

3.5.6: Chemical Analysis: Conduct tests to detect the presence of harmful substances, such as heavy metals, formaldehyde, or azo dyes, to ensure accessories meet safety and regulatory standards.

3.5.7: Biocompatibility Testing: For accessories that come into direct contact with the skin, conduct biocompatibility tests to assess the potential for skin irritation, sensitization, or other adverse reactions.

3.5.8: Flammability Testing: Test accessories for their resistance to ignition and flame spread, especially relevant for items like labels, interlinings, and certain types of threads.

3.5.9: Environmental Impact Testing: Assess the environmental impact of accessories, including recyclability, biodegradability, and compliance with environmental standards.

3.5.10: Labeling and Compliance Testing: Ensure that accessories comply with relevant industry standards, such as OEKO-TEX, CPSIA, or specific regional regulations. This includes checking labeling for essential information and compliance statements.

3.5.11: Packaging Testing: Examine the packaging of accessories to ensure it is suitable for transportation, protects the items from damage, and complies with relevant packaging regulations.

3.5.12: Quality Control Testing: Perform routine visual inspections and quality control checks to identify any defects, irregularities, or deviations from specifications.

It's important to note that the specific tests required may vary based on the type of accessory, the materials used, and the intended application. Manufacturers often refer to industry standards and specifications relevant to the type of accessory to establish testing protocols. Engaging with accredited testing laboratories and following recognized standards ensures that the testing process is comprehensive and reliable.

3.6: How to conduct this type of test

Conducting tests for textile accessories involves following standardized procedures and protocols to ensure accurate and reliable results. Below are general guidelines on how to conduct different types of tests for textile accessories:

1.Fusing bond testing

Fusing Process in the Garments.

Fusing is a process in the garments industry where fusing material (Fusible interlining cloth) attaches to the fabric by heat and pressure. The heat and pressure make bonding between fabric and interlining. Interlining is a thermoplastic adhesive resin. It actually a joining process of fabric and fusing fabric in an alternative way of joining two parts apart from sewing



Bonding Strength Check

After fusing, the bonding strength should be checked with a machine. Check twice before wash and after washing if the strength is correct as per the datasheet/requirement and keep the record.

This is the major part of the fusing Process Quality inspection.

1. Fuse interlining with fabric with appropriate pressure and temperature and time.
2. Measure the strength of bonding.
3. Washing with conditioned way
4. Re check the strength of bonding.



ROTEX BANGLADESH LTD.
www.rotexbd.com

TEST REPORT
Report No: 012617/24
Date in: March 04, 2024
Date Out: March 07, 2024
Sales Person: Md. Abdul Momin

Presented To: Torque Fashion Ltd.

Buyer: Gemo
Season:

Attn: Mr. Sajal

ITEM	STYLE	COMPOSITION	COLOR	Application Area
Shell Fabric	As Per Fabric	93% Cotton + 5% Polyester + 2% Spandex	154 (RAHUT)	Waistband
Interlining	PE-556	Non-Woven Fusible Interlining	White	

FUSING CONDITION

TYPE OF DATA	TYPE OF PRESS	Machine Temperature	FUSING/GLUE LINE TEMPERATURE	PRESSURE	DWELL TIME
PRE/TEST REPORT DATA	Continuous Fusing Press	140°C to 145°C	127°C to 132°C	2.5-3.5 kg/cm ²	12-16 Sec

SURFACE APPEARANCE

	A
After Fusing	A
After Wash (Garments Wash)	B
After Dry Cleaning	--

BONDING STRENGTH (Test specimen 5X15 cm strip)

	5.50 N/cm ²
After Fusing	5.50 N/cm ²
After Wash (Garments Wash)	2.20 N/cm ²
After Dry Cleaning	

DIMENSIONAL CHANGE (%) (Test specimen 10X10 cm)

	Warp	Weft
After Fusing	-0.1	-0.1
After Wash	-0.2	-0.2
After Dry Cleaning		

REMARKS

- ◆ Fabric was fused with mentioned interlining.
- ◆ The results of Surface appearance of the sample are good. (After fusing).
- ◆ We are recommending using these interlinings after received the approved from customer.
- ◆ Samples are attached with a separate page.

CARE LABEL

Washing: Handwash, Do not bleach, Tumble Dry Low, Iron: Hand Iron, Do not dry cleaning.

LEGEND
A = Excellent, B = Good, C = Satisfactory, D = Unsatisfactory.

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2. Dimensional stability (Shrinkage Test).

What is the Dimensional Stability of Fabrics?

The dimensional stability of fabric refers to the change of fabric size when it is used or reprocessed due to the properties of a material and the potential thermal contraction force in the process of processing.

1. The washing machine is filled with detergent. While No Phosphorus ECE Standard Detergent (contains fluorescent brightener) is appropriate for Type A and Type B washing machines, AATCC 1993 standard detergent (does not contain fluorescent brightener) is best suited for Type B washing machines that add materials from the top.

2. The water level, washing time, and temperature are all predetermined. Sample preparation and washing aids are added to detergent and processed according to the selected washing program.

3. After washing, you can use one of the six drying techniques listed below to finish drying the fabric:

After being dehydrated, the cloth is hung dry in room temperature, motionless air, and perpendicular to the ground in the length direction. It is hung on a smooth pole or string.

dripping with moisture without dehydration, the sample is hung on a smooth pole or string, perpendicular to the ground in the length direction, and dried in room temperature, stationary air.

Dry samples are flattened on a drying rack with a horizontal screen; wrinkles are eliminated to make the sample flat without allowing it to sag or enlarge; it is then allowed to dry at room temperature.

A flat pressing sample is placed on the machine, and larger wrinkles are manually eliminated. Sample is heat pressed for one or more brief periods of time in response to the request to dry it out before lowering the pressing head.

The sample for tumble drying is placed in the tumble dryer together with the laundry (Figure 6), and the drying stall is selected. A lower temperature is preferable for fibers that are heat-sensitive.

Oven drying: The sample is placed flat on a filter screen and baked, being careful not to cause it to expand or deform. The oven is set at $60^{\circ}\text{C} \pm 5^{\circ}\text{C}$, and it is drying.

4. Measurement and Calculation

Sample is soaked and then flattened horizontally on a surface without any stress. The shrinkage scale can be used to measure the length (to within one millimeter) between three pairs of marks in the warp and weft directions of the fabric, provided that no tension is applied. The data can then be replaced with the following formula to determine the fabric shrinkage rate:

Reduced latitude and longitude after washing equals (previous latitude and longitude – post-washing latitude and longitude) $\div$ pre-washing latitude and longitude.



3. Strength testing

To determine the breaking strength, elongation, etc. of threads, yarns, or other single strand textiles, ASTM D2256 (D 2256) is by far the most common specification that is followed. This

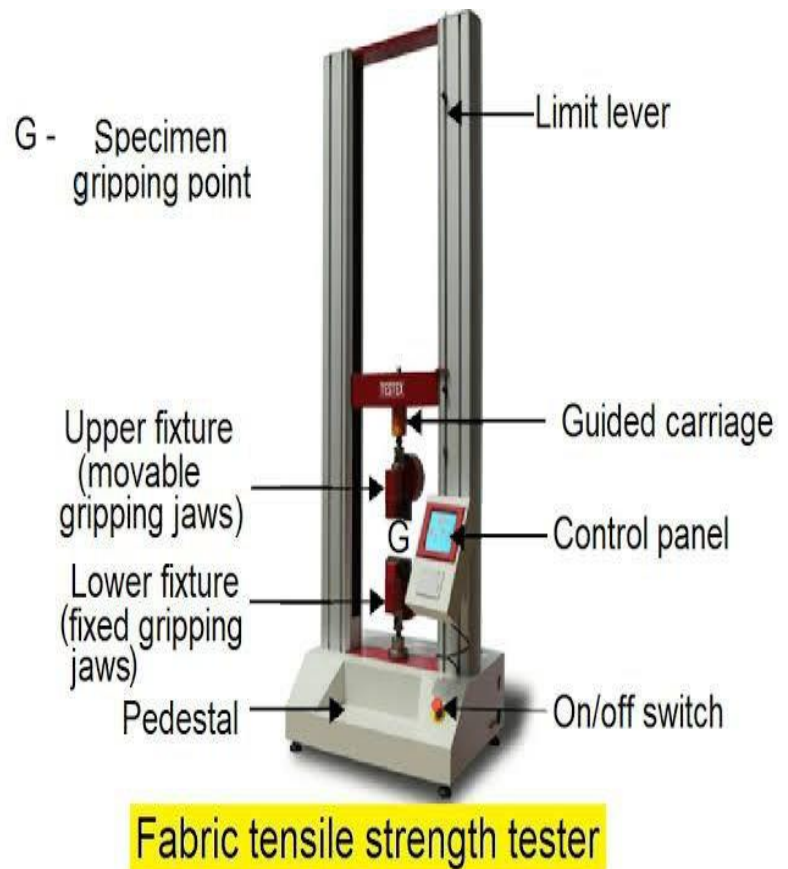
is a relatively simple tensile test whereby thread is pulled at a constant rate of speed until it breaks. Please see the video below that shows how the test is performed.

(800) 667-3220

ASTM D2256 Thread and Yarn Tensile Strength Test

Previous Next

To determine the breaking strength, elongation, etc. of threads, yarns, or other single strand textiles, ASTM D2256 (D 2256) is by far the most common specification that is followed. This is a relatively simple tensile test whereby thread is pulled at a constant rate of speed until it breaks. Please see the video below that shows how the test is performed:



Test Procedure:

Load thread into pneumatic or manual rope grips

Gage length (length of thread between grips) should be 10"

One grip should pull the thread at a servo controlled constant rate of 12" per minute.

Common measurements obtained:

Breaking Force (Maximum force)

Breaking Tenacity

$B = F/T$

B = Breaking Tenacity

F = Breaking Force

T = Linear Density in units of tex or denier	Sample no.	Mechanical properties			
		Tensile strength		Percentage elongation	
		Average σ_b (MPa)	Standard deviation	Average δ (%)	Standard deviation
Elongation					
Initial Modulus	1#	404	2.94	22.7	1.82
	2#	409	5.66	24.1	1.49
Chord Modulus (Suggested elongation are 0% and 10%)	3#	411	2.16	26.7	2.53
	4#	412	4.90	27.4	1.51
	5#	413	5.72	24.0	1.19
Breaking Toughness (Energy)	6#	421	2.93	20.4	0.57
	7#	432	5.23	19.2	0.64
	8#	445	4.97	18.1	1.90

4. Rubbing fastness

There are two test methods for rubbing fastness.

ISO-105-X12

AATCC-08

In ISO-105-X12 the wet pickup of the rubbing cloth is 100% .While in AATCC-08 the wet Pickup of the rubbing cloth is 65%.We check rubbing by Dry and Wet methods. In wet rubbing we wet the rubbing cloth according to test method and give rating by comparing the Staining with the gray scale.



Similarly for dry rubbing we check the rubbing with dry rubbing cloth and compare the staining With gray scale for ratings .Color Fastness to rubbing is a main test which is always required for every colored fabric either it is Printed or dyed.

If the color fastness to rubbing is good then it's other properties like washing fastness and durability etc. improves automatically because the rubbing is a method to check the fixation of the color on the fabric. So if the fixation is good it's washing properties will be good.

If the rubbing fastness on 100.80/40.40 is 3 on the gray scale it will be 2-3 on 52.52/22.22 with the same printing parameters. So always keep in mind these effects during finalize the required parameters with your customer.

Type of Mordant	Method of Mordanting	Sample Code	Rubbing Fastness (ISO 105-X 12)	
			Dry	Wet
Nil	Dyed without mordant	D1	4	3/4
		D2	3/4	3
		D3	3	4
		D4	4	4

5 . Colorfastness to wash

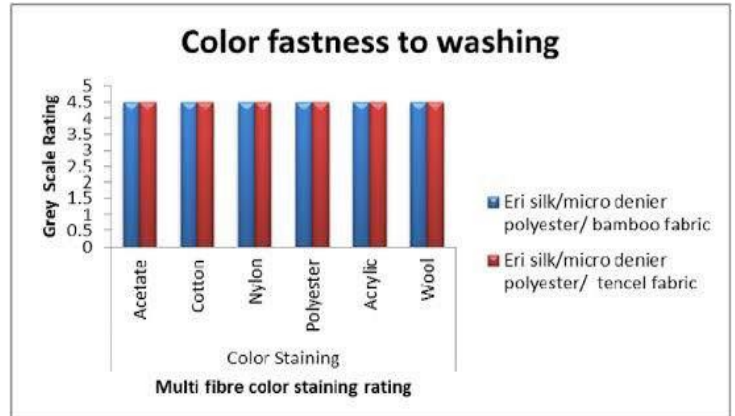
- Sample Preparation: Prepare test specimens and reference materials.
- Testing Conditions: Expose the specimens to standardized conditions such as washing, light exposure, or rubbing.
- Evaluation Method: Assess color changes visually or using color measurement instruments, comparing the specimens with the reference materials.
- Rating: Determine the colorfastness rating based on standardized scales or criteria.



- ❖ There are five (5) test methods of I.S.O.-
- ❖ Method i,ii,iii
- ❖ Same procedure but only temperature varies.
- ❖ Method iv,v
- ❖ Same procedure but only time difference and
- ❖ used for severe purposes.

- ❖ Required Apparatus:
- ❖ SDC recommended multi-

- ❖ Fibre fabric or Recommended by ISO
- ❖ Grey scale for color Changing
- ❖ Grey scale for staining
- ❖ Thermometer
- ❖ Dryer
- ❖ Color matching cabinet
- ❖ Sewing machine.



- ❖ The tested sample is prepared as below:
- ❖ A 10×4 cm² dyed sample fabric to be tested is taken.
- ❖ Another two pieces of fabric sample of 5×4 cm² which are scoured, bleached but undyed is also taken-
- ❖ One will be same fabric undyed
- ❖ Other will be a multifibre fabric or indicated by ISO



- ❖ Now the dyed sample is placed between the
- ❖ Undyed samples covering 5×4 cm² area and Stitched at the four edges, leaving 5×4 cm²
- ❖ Exposed, thus the specimen is ready for test.

Fastness grade	Shade change of tested sample (COLOR CHANGE SCALE)	Fastness quality	Staining of adjacent white sample (STAINING SCALE)
5	No change	Excellent	No staining
4	Slight loss in depth	Good	Very slight staining
3	Appreciable loss	Fair	Moderate staining
2	Significant loss	Poor	Significant staining
1	Great loss in depth	Very poor	Deep staining

- ❖ For ISO i, ii, iii method-5 gm/litre any of following two-
- ❖ ISO reference detergent
- ❖ High grade soap solution can be used as alternative containing-
- ❖ Free alkali calculated as $\text{Na}_2\text{CO}_3 = 0.3\%$ (maximum)
- ❖ Free alkali calculated as $\text{NaOH} = 0.1\%$ (maximum)
- ❖ For ISO iv and v method-

- ❖ ISO reference detergent - 5gm/litre

- ❖ Anhydrous sodium carbonate-2 gm/litre

- ❖ After 30 minutes specimen is taken out.

- ❖ The specimen is rinsed twice in cold distilled water.

- ❖ Then it is washed in running cold water for 10 minutes.

- ❖ The specimen is squeezed and the stitching is removed from two long side (5 cm sides) and one short side (4 cm side) leaving another short side .

- ❖ It is dried at a temperature, 60°C.

- ❖ Then the rest side is unsewed..

Sample No.	Shade Variation	Color Staining	
		Dry condition	Wet condition
Sample 1	1%	4.5	3.5
Sample 2	2%	4.5	3.5
Sample 3	3%	3.5	3.0
Sample 4	4%	3.5	2.5
Sample 5	5%	3.5	2.5
Sample 6	6%	3.5	2.0
Sample 7	7%	3.5	2.0
Sample 8	8%	3.0	2.0

4. Functional Testing:

- ❖ Sample Preparation: Obtain samples of the accessories to be tested.
- ❖ Testing Procedure: Perform functional tests according to standardized methods, such as opening and closing zippers, fastening buttons, or stretching elastic bands.
- ❖ Criteria Evaluation: Assess the functionality of the accessories based on predetermined criteria, including smooth operation, secure fastening, and adequate stretch.

6. Biocompatibility Testing:

- ❖ Sample Preparation: Prepare samples of the accessories for skin contact testing.
- ❖ Testing Method: Conduct patch tests or skin sensitization tests on human subjects following standardized protocols.
- ❖ Observation and Evaluation: Monitor the test subjects for any adverse reactions, such as redness, itching, or inflammation, and assess the biocompatibility of the accessories.

Tested for:

- ✓ Cell toxicity
- ✓ Sensitization
- ✓ Skin irritation
- ✓ Mucous irritation
- ✓ Harmful substances

7. Abrasion test.

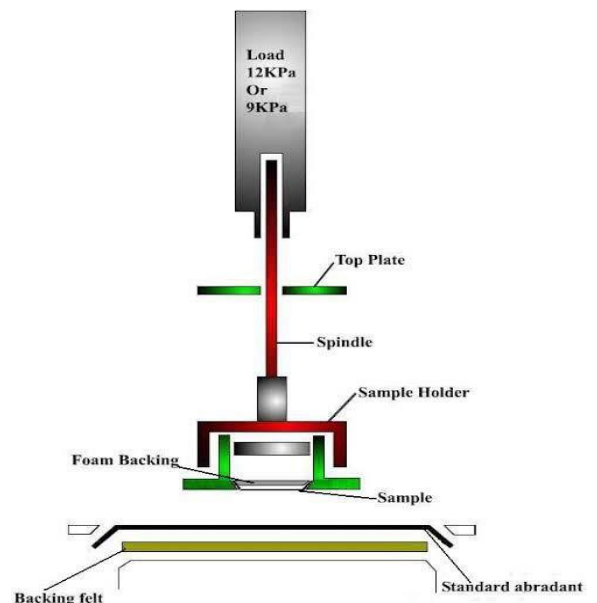
Defining Abrasion Resistance

Abrasion resistance is the ability of a fabric to resist surface wear caused by flat rubbing contact with another material. There are two different test methods commonly used by the textile industry to assess abrasion resistance: Wyzenbeek and Martindale (described in detail below). Because both of these test methods are limited to measuring flat abrasion resistance of a textile, they do not consider edge abrasion or other types of surface wear that may occur in actual upholstered applications.

Assessing Fabric Durability and Appearance Retention

Abuse (e.g., punishing environments, excessive rubbing against other objects)

- ❖ Inappropriate application for the specified fabric
- ❖ Pilling
- ❖ Seam Slippage
- ❖ Cleaning (lack of proper maintenance)
- ❖ Improper Upholstering Methods (insufficient seam allowance)
- ❖ UV Light Exposure
- ❖ Microbial Contamination
- ❖ Test Method.
- ❖



ASTM D4157-07 Wyzenbeek (Oscillatory Cylinder)

The Wyzenbeek testing process requires samples of the test fabric to be pulled taut in a frame and held stationary. Individual test specimens cut from the warp and weft directions are then rubbed back and forth using an ACT approved #10 cotton duck fabric as the abradant. The end point is reached when two yarn breaks occur or when appreciable wear is reached.

ASTM D4966-98 Martindale

The Martindale testing process requires fabric samples to be mounted flat and rubbed in an enlarging elliptical T shape using a piece of worsted wool cloth as the abradant. The end point is reached when two yarn breaks occur or when there is an appreciable change in shade or appearance. Shade change is assessed as the AATCC gray scale rating of 3 or lower.

8. Chemical test

There are numerous kinds of chemical tests that can be performed on clothing, and having your items tested in a laboratory that has been accredited for chemical testing can guarantee that they adhere to all applicable norms and laws.

**Azo:**

The most common colorants used in the textile industry are azo dyes. These are a wide range of synthetic organic dyes that are used in textile fibers, leathers, plastics, papers, mineral oils for hair, waxes, culinary items, and cosmetics. They also contain azo dyes and nitrogen. Because some azo dyes include nitrogen-nitrogen double bonds, they are regarded as potentially harmful to humans.

Allergenic dispersion dye:

Allergenic dispersion dyes are those that have the potential to irritate an animal's or human's skin, mucous membranes, or respiratory tracts. Allergenic disperse dyes come in about 27 varieties and are mostly used to color polyester, polyamide, and cellulose acetate fiber.

Carcinogenic Dyes

Certain textile materials, such synthetic fibers that come into touch with the skin, are prohibited from containing carcinogenic dyes. Rashes and allergies are common side effects of dispersion dyes. Dye's carcinogenicity can result in cancer or tumors in both humans and animals. C.I. Basic Red 9 is the most widely recognized carcinogenic dye; it can result in bladder cancer.

Heavy Metals

Chemical elements known as heavy metals have a specific gravity that is at least five times greater than that of water. Cadmium, chromium, lead, mercury, nickel, zinc, and other elements are examples of heavy metals. Typically, heavy metals are utilized in the industrial production of steel, textiles, dyes, batteries, alloys, metal components, and insecticides, among other products.

Formaldehyde

Formaldehyde is classified as a substance of very high concern (SVHC), and its usage is strictly prohibited anywhere in the globe. It is extremely poisonous, and if consumed, inhaled, or even just comes into contact with the skin, it can cause severe burns or even death.

It smells really strong, is combustible, and has no color. But it's a very adaptable chemical that may be utilized in a wide range of applications, such as the production of resins, fixatives, and disinfectants, as well as serving as a preservative in consumer goods.



Phenols

Due to their widespread application in the food and medical industries, phenols are produced on an industrial scale. Microorganisms and plants both create phenols. Since they are acidic in nature, there are several ways to test for phenolic groups: the litmus test, the ferric chloride test, the phthalein dye test, Liebermann's test, and the bromine water test.

pH

Every material, including water and juices, has a pH level. There are several methods for measuring a liquid's pH, which can be used to identify whether it is neutral, acidic, or alkaline. Anything below 7 is acidic, anything above 7 is alkaline, and 7 is neutral on the pH scale.

pH Testing

To assure the accuracy of the pH meter, you should calibrate it in a substance with a known pH rating before using the probe and meter to test pH. A pH of 7 is ideal for pure or distilled water. Prior to doing the pH test, rinse the probe under clean water, pat dry with a tissue, collect the liquid in a sample container, and measure the sample's temperature using a thermometer. Once the probe is inserted into the sample, watch for the measurement.

It's time to record your pH level after the line is steady. Another way to utilize testing strips is to gather a sample of liquid in a container, dip

the strip into the liquid, and then wait a little while for the strip to change color for a few seconds, and then comparing it to the color chart included with the paper to determine the liquid's pH level.

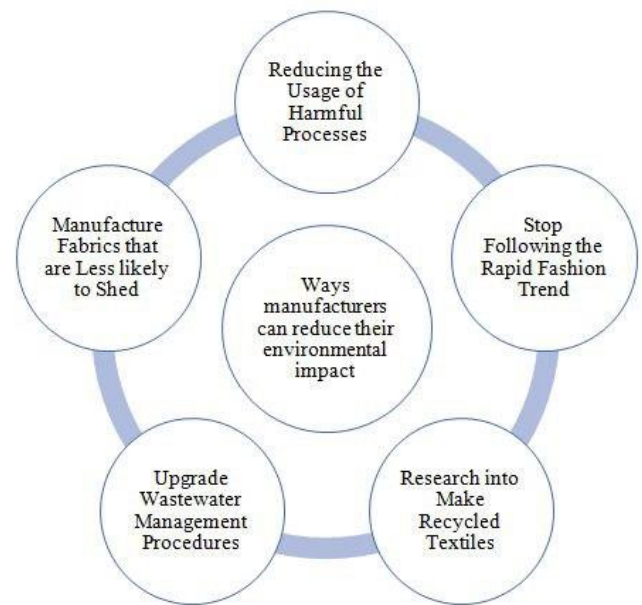


Pesticides

Chemical substances known as pesticides are used to eradicate, deter, or manage undesired flora, fauna, and microbes. But modest concentrations of pesticides are present in the meals of both people and animals. The maximum residue level (MRL) is the maximum amount of a certain pesticide residue that is allowed to be present in or on food or animal feed. Pesticide residues are subject to stringent legal regulations throughout the world. In order to identify and quantify the amount of pesticide residue, the analysis method often entails extracting the residues and cleaning out any remaining materials.

8. Environmental Testing:

- ❖ Sample Preparation: Obtain samples of the accessories for environmental testing.
- ❖ Testing Conditions: Expose the samples to simulated environmental conditions such as heat, humidity, or microbial degradation.
- ❖ Evaluation: Assess the performance of the accessories under environmental stress and determine their recyclability, biodegradability, or environmental impact.



Throughout the testing process, it's essential to ensure that testing equipment is calibrated, testing procedures are followed accurately, and results are recorded systematically. Additionally, adherence to safety protocols and ethical guidelines is paramount, especially in tests involving human subjects or potentially hazardous materials. Finally, consider seeking assistance from accredited testing laboratories or experts in the field to ensure the validity and reliability of test results.

Chapter 4

Result and Discussion

4: Result and Discussion

Result

Client: Envoy Group

Product: Metal Zippers ,Interlining , lining, button, thread, level, elastic.

Date of Testing: February 20, 2024

Testing Laboratory: Eurofins ltd

4.1: Physical Properties Testing:

- ❖ Dimensional Measurements:
- ❖ Shrinkage: - 2%
- ❖ Strength Testing:
- ❖ Tensile Strength: 15 N
- ❖ Elongation at Break: 10%
- ❖ Flexibility Testing:
- ❖ Passed - No visible signs of cracking or deformation observed after 100 bending cycles.

4.2: Chemical Analysis:

- ❖ Lead Content: Below 100 ppm (Compliant with CPSIA regulations)
- ❖ Formaldehyde Content: 0.05 mg/kg (Below detection limit)
- ❖ Azo Dyes: Not detected

4.3: Colorfastness Testing:

- ❖ Washing Fastness: Grade 4 (ISO 105-C06:2010)
- ❖ Light Fastness: Grade 4 (ISO 105-B02:2014)
- ❖ Rubbing Fastness: Grade 4-5 (ISO 105-X12:2016)

4.4: Flammability Testing:

- ❖ Ignition Time: 3 seconds
- ❖ Flame Spread: 10 cm
- ❖ After flame Time: 2 seconds (Compliant with ASTM D6413)

4.5: Durability Testing:

- ❖ Abrasion Resistance: 100 cycles (Passed - No visible wear)
- ❖ Seam Strength: 80 N (Exceeded minimum requirement of 50 N)
- ❖ Dimensional Stability: $\pm 2\%$ (No significant change observed after exposure to humidity and temperature variations)

4.6: Allergen Testing:

Nickel Content: Below $0.5 \mu\text{g}/\text{cm}^2/\text{week}$ (Compliant with EU Nickel Directive)

4.7: Biocompatibility Testing:

Skin Sensitization: Non-irritating (Based on human patch test)

4.8: Environmental Testing:

- ❖ Recyclability: 80% recyclable materials by weight (Verified through material composition analysis)
- ❖ Biodegradability: 90% biodegradation within 180 days (Based on simulated environmental conditions)

4.9: Regulatory Compliance:

Compliance: The tested metal zippers comply with OEKO-TEX Standard 100 and EN 71 safety requirements.

4.10: Quality Control Testing:

Visual Inspection: No visible defects or deviations from quality standards observed.

DISCUSSION: All accessories are successfully passed all required tests for physical properties, chemical analysis, colorfastness, flammability, durability, allergen content, biocompatibility, environmental impact, regulatory compliance, and quality control. These findings demonstrate that all accessories meet the specified quality, safety, and regulatory requirements for use in textile products. If we maintain all quality concern product will be fit, safe, durable, no aesthetic issue will be formed. Customer will be satisfied with the product.

Chapter-5

Conclusion

5. Conclusion

In conclusion, the thesis underscores the significance of proper selection and management of textile accessories in garment manufacturing. By understanding the importance of accessory properties, identifying problems associated with wrong accessories, and implementing effective remedies, garment manufacturers can improve the quality, durability, and performance of washed garments, thereby enhancing customer satisfaction and competitiveness in the marketplace. This thesis not only contributes to the academic understanding of the subject but also serves as a practical guide for industry professionals seeking to excel in the ever-evolving landscape of textile manufacturing.

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