

## Selecting textile fibers to match the design & final product functional use to meet the challenges of the local & global market

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### Abstract:

Our life nowadays depends on the satisfactory performance of products & services, whether it be the transmission, distribution networks of electricity & water, health services, or the level of performance of some products used for different purposes of fabrics, which is our area of research where there is no room to accept deterioration & low quality of the performance of products, this concept has led to an increased need to raise the level of performance of products. **The research problem** is summarized in the economic confrontations, challenges that the country is going through & the interest in the textile industry with quality, material, its use for the appropriate purpose & it must be upgraded in terms of shape, price & appropriate performance so that we can compete with our textile products locally & internationally. **Research objectives:** Upgrading the Egyptian textile product in terms of quality to achieve its functional purpose, Achieving quality in Egyptian textile products, to achieve competition in the local & international markets, Working to satisfy the consumer's taste by achieving the elements of quality of raw materials, product form & reasonable price. **Research results:** Ensuring proper quality of the raw material of the product to achieve the functionality of the most important quality requirements. Carefully choose the appropriate material to meet the needs & requirements of job performance. Dem & for synthetic fibers & raw materials is increasing due to their advantages such as tensile strength, fire resistance, & others. Ease of raw materials & the manufacture of synthetic fiber has led to its use in many sectors such as civil engineering, ships & hardware manufacturing, transport & communications. The lightweight of synthetic fibers gave it a major advantage over the rest of the raw materials, in manufacturing in various fields such as cars, airplanes, curtains for theaters, cinemas & other synthetic sectors. The tensile strength & the tolerance of consumption of synthetic fibers led to their use significantly in agricultural industries such as greenhouses & others.

### Keywords:

*Textile Fibers  
Functional Use  
Global Market  
Local Market*

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### Introduction:

Our life nowadays depends on the satisfactory performance of products & services, whether it be the transmission, distribution networks of electricity & water, health services, or the level of performance of some products used for different purposes of fabrics, which is our area of research where there is no room to accept deterioration & low quality of the performance of products, this concept has led to an increased need to raise the level of performance of products.

The foundations of a quality start from setting requirements for the consumer & end only when the product reaches the consumer's h& & is fully satisfied with its performance. (1995) The implementation of the first agreements, the GATT, COMESA & these agreements bind countries to their regulations, & although we are like other developing countries, took a grace period to arrange our situation, but in this era, we apply the

laws & rules of various agreements that regulate world trade, & control the movement of Transactions according to specific standards, if a country violates one of these rules, it will not only be subject to a single penalty but will also be blacklisted by the World Trade Organization, which is responsible for managing, implementing & controlling the Geneva-based GATT agreements. Hence it is not optional to keep up with the different countries in quality standards, but also to compete against it under the economic conditions that the country is going through, it is time to join h&s in our specialization to master the end work in the product that it does so that it can compete in the local & international market.

From the standards of the ruler of production to the renewal of the goods offered in the markets with a statement of their origin & types & the extent to which the product conforms to the quality of performance required when using. In

particular, Arab countries in general & Egypt, in particular, are expected to face stiff competition from Southeast Asian countries in the export of textile products, & this is evident even to the general market. Although Egypt is one of the small export countries, we are now experiencing a renaissance in guiding manufacturers & producers in the mastery of the product. The huge challenges facing Egypt at the current stage require intensive & orderly cooperation between the government, the public business sector, private parts & even the Egyptian society as a whole.

We now dem& immediately the establishment of a new parallel system of financing mechanisms, to meet the requirements of the times. The resulting fabric, filament are the ones that achieve their purpose & are readily available, continuously & cheap.

Through this research, we will discuss the impact of the type of material used, on the identification & selection of the right product for performance & final use.

**Research problem:**

The research problem is summarized in the economic confrontations, challenges that the country is going through & the interest in the textile industry with quality, material, its use for the appropriate purpose & it must be upgraded in terms of shape, price & appropriate performance so that we can compete with our textile products locally & internationally.

**The importance of research:-**

The importance of the research is summarized in the following points:

1. Study the effect of the type of material used on the quality of the final product & its functional performance.
2. Reaching with textile products to a high degree in achieving product quality & satisfying the consumer.
3. Upgrading Egyptian textile products to be able to compete in the local & international markets.
4. Reaching the best material that achieves functional performance, achieves quality at product & reasonable price, & satisfies the consumer taste as well.

**Research objectives:-**

The research aims at the following points:

- 1- Upgrading the Egyptian textile product in terms of quality to achieve its functional purpose.
- 2- Achieving quality in Egyptian textile products, to achieve competition in the local & international markets.
- 3- Working to satisfy the consumer's taste by achieving the elements of quality of raw materials, product form & reasonable price.

**Research Introduction:-**

Textile materials are considered multiple sources due to the nature of their fibers, either they are natural fibers or synthetic fibers, & the following figure shows the general division of raw materials & their manufacture

| Textile fibers          |                  |                      |                      |               |                  |                         |   |  |                               |   |
|-------------------------|------------------|----------------------|----------------------|---------------|------------------|-------------------------|---|--|-------------------------------|---|
| Natural fibers          |                  |                      |                      |               | synthetic fibers |                         |   |  |                               |   |
| Organic                 |                  |                      | Inorganic            |               | Organic          |                         |   |  | Inorganic<br>(Glass, silicon) |   |
| Vegetable fiber         |                  |                      | Animal fiber         |               | Miniral          | From synthetic polymers |   | Regenerated From natural polymers        |                               |   |
| Leaf<br>(Manila, sisal) | Seed<br>(cotton) | Bast<br>(Flax, jute) | Secretor y<br>(silk) | Fiber<br>wool |                  | Asbestos                | Nylon<br>polyamide<br>Polyester<br>PolyAcrylic<br>Poly viny<br>Polyethylene | Cellulose<br>Viscose<br>Rayon<br>Acetate |                               | Protein<br>Casein<br>Keratin<br>Albumen |

The many differences in the types & properties of the textile materials allow the selection of the appropriate material for the specific performance purpose so that the product is given the ideal properties, & the performance characteristics to be achieved .(Insaf Nasr, Kawthar Al Zoghbi, 2005)

**\* The characteristics of the textile materials commonly used:-**

The following table shows the characteristics of commonly used textile materials, including their source, features, defects & use as well.

| Natural plant filaments |                          |  |   |                      |
|-------------------------|--------------------------|--|---|----------------------|
| Filament                | source                   | Advantages   | Disadvantages   | Uses                 |
| Cotton                  | seed of the cotton plant | High tensile strength, consumption resistance, rapid drying, easy dyeing & printing, moisture absorption | Somewhat under flexibility, ease of wrinkle, shrinking, weakened when rotting | Underwear& outerwear |

|              |                            |  |   |   |
|--------------|----------------------------|--|---|---|
| <b>Flax</b>  | stem of flax plant         | High tensile strength, consumption resistance, rapid drying, easy printing & dyeing, moisture absorption | Easily wrinkled, easily shrinks, vulnerable to mold & fungi, curls easily, shrinks easily | Clothes   |
| <b>Jute</b>  | the stem of the jute plant | Cheap price  | Thick, strong when wet, weak, lusty, easily wrinkled.                                     | Sacks, bags & linings fabrics                         |
| <b>Ramie</b> | stem of ramie plant        | Natural shine, easy pigmentation, rapid dryness, moisture absorption, good tensile strength when wetness | Expensive   | Fishing nets, fire hoses, dusters, upholstery fabrics |
|              |                            |  |   |   |

**Natural protein filaments**

| <b>Filament</b>     | <b>source</b> | <b>Advantages</b>   | <b>Disadvantages</b>  | <b>Uses</b>                 |
|---------------------|---------------|---|---|-----------------------------|
| <b>Wool</b>         | Sheep         | Warmth, Comfort, Flexibility, Absorbency, Ease of dyeing, Flame resistance & Softness | Sensitive to alkaline substances, vulnerable to moth, shrinks & sags easily | Clothes & carpets           |
| <b>Silk</b>         | Silkworm      | Luxury, Flexible, Antiwrinkle, absorption & easy dyeing                               | Yellows over time, weakened when exposed to sunlight, vulnerable to insects | Clothes                     |
| <b>Mohair fiber</b> | Angora Goat   | Lustor & strong   | Expensive   | Men's clothing & upholstery |
| <b>Kashmir</b>      | Cashmere Goat | Warmth, luxurious   | Requires special care, sensitive to chemical reactions, expensive           | Dresses, Jackets & Sweaters |
| <b>Camel fiber</b>  | Camel         | Warmth, luxurious   | Expensive   | Jackets, suits & sweaters   |
| <b>Llama wool</b>   | Lama          | Warmth, light weight, natural luster, excellent drip, beautiful surface effect        | Expensive   | Men's & women's clothing    |
| <b>Alpaca wool</b>  | Alpaca        | Luxurious   | Expensive   | Jackets & suits             |

**synthetic filaments from Cellulosic base**

| <b>Filament</b>       | <b>source</b>                        | <b>Advantages</b>   | <b>Disadvantages</b>  | <b>Uses</b>                       |
|-----------------------|--------------------------------------|---|---|-----------------------------------|
| <b>Rayon, viscose</b> | the cellulose of wood pulp or cotton | Cheap, easily dyed, printed & finished, highly absorbent  | Weakens when wet, has low elasticity, wrinkles easily weaken in light | Clothes                           |
| <b>Acetate</b>        | Cotton linter or wood chips          | Absorption, bright & shiny, good elasticity, fireproof, good drop, cheap, good stability of colors    | Weakens when wet, sensitive to heat, generate static electricity      | Luxurious silk clothes & curtains |
| <b>Triacetate</b>     | Cotton linter or wood chips          | Good Abrasion Resistance, Can Dye Easily, Accept Heat Fixation, Frizz Resistant, Stay as White It is. | Pigment may be affected by ozone                                      | Light fabrics & heavy fabrics     |

**synthetic fibers from synthetic polymers**

| <b>Filament</b> | <b>Source</b>     | <b>Advantages</b>        | <b>Disadvantages</b>                                   | <b>Uses</b>                       |
|-----------------|-------------------|--------------------------|--|-----------------------------------|
| Acrylic         | Polyacrylonitrile | Durability, flexibility, | Looping, Low absorption, sustainability for oil stains | Curtains, carpets, suits, skirts, |

|           |                    |  |  |                                      |
|-----------|--------------------|--|--|--------------------------------------|
|           |                    | bulkiness, acceptance of thermal stabilization, dimensions stability, durability, rapid drying |  | blankets, furniture.                 |
| Nylon     | Petroleum polymers | Affected by heat, resistant to moth & insects  | Low absorption, low sun resistance                     | Carpets, Beachwear, Socks, Furniture |
| Polyester | Petroleum polymers | Wrinkle-resistant, good dimensional stability, durability, accepts thermal fixation            | Low moisture absorption, sustainability for oil stains | Carpets, upholstery                  |

(Mohamed Sabry,2001)

We will explain the classification of fibers used in textile products based on the following:

**\* Fundamentals that determine the quality of fibers:**

There are six fundamentals for the quality of the fibers that make them suitable & spread in fabrics:

**\* Fiber Length:**

A filament of fewer than 1.4 inches is a very short filament, & it cannot be spanned economically. The importance of filament length is that it increases the strength of the spun thread & in some materials, it expresses the degree of polymerization & maturity of the filament.

**\* Filament Tensile Strength:**

Filament tensile strength is known as its ability to resist the stresses it is exposed to, during the various stages of manufacturing. Both wetness & humidity affect the tensile strength of the fiber, so we find it increases the tensile strength of some

**\* Longitudinal appearance & cross-section of the filament:**

fibers such as cotton while it reduces the tensile strength of other fibers such as rayon.

**\* Formability:**

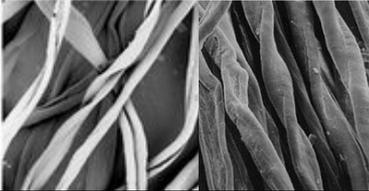
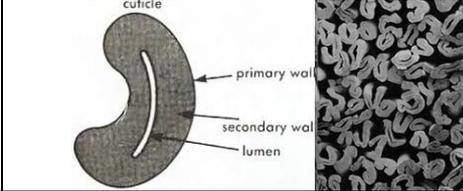
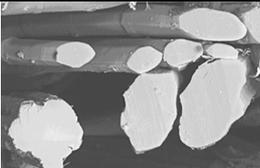
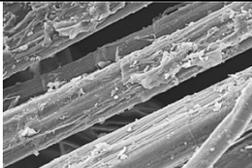
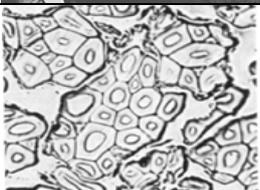
Meaning that the fibers are easy to bend & shape without being split.

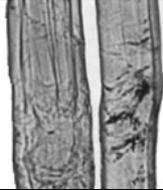
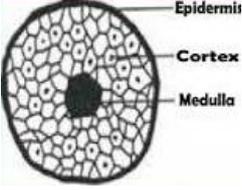
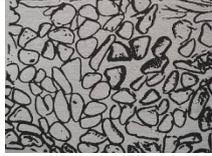
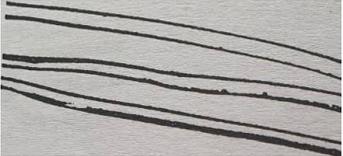
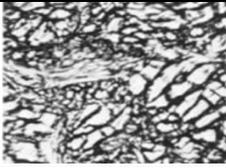
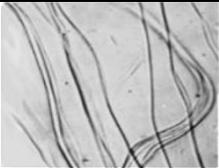
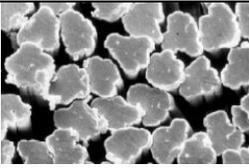
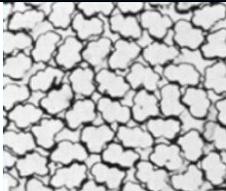
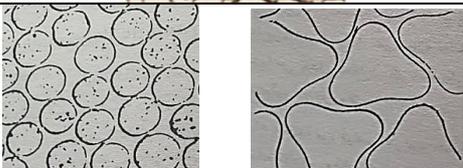
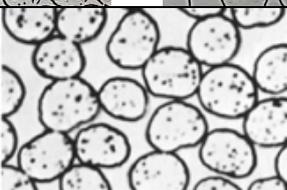
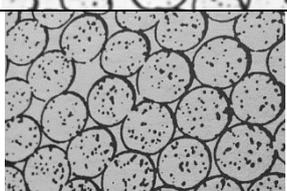
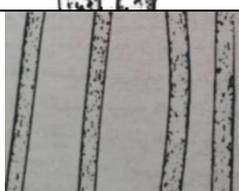
**\* Flexibility:**

The filament must be stretchable & elongated if it falls under the influence of a particular force & then returns to its original form after the effect of this force has been removed.

**\* Moisture absorption:**

moisture absorption is concerned with the behavior of fibers exposed to atmospheric humidity, & the interactions of fibers with liquid water. This is in addition to that there must be sufficient quantities & a permanent source to obtain this raw material along with its reasonable price. If all the overmentioned conditions are met, the filament is used widely. (Fibre to Fabric, 2020)

| Filament      | Longitudinal appearance   | cross-section   |
|---------------|---|---|
| <b>Cotton</b> |  |   |
| <b>Flax</b>   |  |  |
| <b>Jute</b>   |  |  |

|           |   |   |
|-----------|---|---|
| Ramie     |    |    |
| Wool      |    |    |
| Silk      |    |     |
| Asbestos  |    |    |
| Viscose   |   |    |
| Acetate   |  |  |
| Naylon    |  |  |
| Acrylic   |  |  |
| Polyester |  |  |

(Krishnendu Das., Sem-IV Unit-II, Textile fiber identification, p5,2009)

**\* Classification of fabrics according to the purpose of final use:**

Fabrics are classified according to the purpose of final use into:

- a) Clothing & Apparel Fabrics
- b) Upholstery fabrics
- c) industrial Fabrics

It is not expected or likely that a single textile product will be used in two different uses, such as being used as clothing fabrics or for furnishings,

because the performance requirements for each of them are completely different from the other, while in apparel fabrics you need to provide some important & necessary properties for quality performance such as absorption, permeability & retention. As in the form when used, we find that upholstery fabrics require other properties, just like friction resistance, resistance to sunlight, etc., meaning that the nature of the final use & the requirements for this use determines the type of product used & its efficiency in performance when used.

**a) Clothing & Apparel Fabrics:**

The choice of textile products for clothing fabrics is a personal decision, which varies from one individual to another depending on the prevailing fashion, lifestyle & income level, as well as gender (man, woman, children) has a great influence, & this choice is affected by aesthetic, physiological, psychological & economic factors.

**& here comes the most important question, what does the consumer want (quality or fashion):**

Sometimes the consumer resorts to quality & other times he resorts to fashion, & the consumer's preference for this or that differs depending on the nature of the country in which he lives (developed or developing country) & the degree of consumer education & culture as well as the era in which he lives. Long years ago, quality was considered more important than fashion, & for some time, within nearly 50 years, fashion became the most advanced & prevalent, & now the consumer has returned once again to lean towards quality & increased his interest in it.

**\* The quality of fabrics required in the market now:**

If we want to define the quality of the fabric, we find that the quality of the fabric is that quality that satisfies & convinces the consumer, & this

only comes when the quality requirements meet the requirements of the final use of the consumer, so the manufacturer & designer must be in constant & direct contact with the consumer to meet all the necessary performance requirements in a particular use.

**\* The importance of evaluating the properties of the fibers:**

The evaluation of the properties of the filaments provides an opportunity to choose the most appropriate of these filaments for the product performance requirements. Of course, it is difficult to expect that the properties of the filaments are fully reflected in the properties of the final product, given that the properties of the textile product are also affected greatly by the production & processing methods used, but there is always a great possibility.

**\* Principles for choosing a textile product to be used as clothing fabrics:**

Both Hollen & Saddler stated that before buying a particular product, the consumer must bear in mind several factors in answering the following questions:

- Who will use this product? ➤ Where will the product be used?
- How will the product be used? ➤ When will the product be used?
- How long will the product be used?

Which of the following factors is more important when using: (durability, comfort, care, appearance, fashion, size, price, & whichever is less important?) Annal & Sara also mentioned that choosing from several possibilities for a particular final use, which are They can be presented in the form of questions as shown in the following table:

|          |                                  |  |
|----------|----------------------------------|--|
| <b>1</b> | <b>Aesthetic properties:</b>     | Is this product attractive? IS its appearance is being appropriate to the nature of its use? What does it look like? What do you feel about it?  |
| <b>2</b> | <b>Durability:</b>               | Will this product continue to be used for the expected period? Or will it wear out faster than expected?   |
| <b>3</b> | <b>Comfort:</b>                  | Is this product comfortable enough to be used for the purpose for which it was produced? Does it cause feeling very warm or very cold? Does it feel good when touching the skin? Does comfort change as a result of using it & wearing it? Does comfort change as a result of different cleaning procedures? |
| <b>4</b> | <b>Keep the shape when using</b> | Does this product keep its appearance during use & cleaning? Does it resist creation? Does it keep its shape?  |
| <b>5</b> | <b>End-use &amp; care:</b>       | Does it look good throughout its use? Are the care & treatments required to keep the new appearance of this product during use, cleaning & storage easy & affordable?  |

(Norma Hollen, Jane Saddler, 1988)

For example, let us examine the necessary performance requirements for the uniform used in the work, beginning with looking at the aesthetic factors, which include the fashion & the appropriate appearance of the nature of that work or company of color & style, then we will look at the requirements for durability, & specifically the life span of this product, is it six months or two or more? This is followed by the comfort factor, which the study believes comes in the first place in the performance requirements of this type of product, especially since it is difficult for a person to concentrate on work if the clothing, he wears causes him some kind of sensitivity or itch, or in other words uncomfortable, As well as the factors of retaining the shape when using, which may be related to antiwrinkle. The uniform must be able to maintain its shape when in use. Finally, the care factors include the method required to clean the uniform frequently, then we begin to choose the product that offers the best performance requirements when using this, after making sure. Ensuring that its cost is appropriate to the consumer's income level. Based on this evaluation,

we decide to buy or not to purchase a specific product. In general, the choice of the consumer is mainly based on his information, experience, experiences, needs & expectations. If he has information about the fabric, he will choose smartly, whatever, any selection often has a good & successful part & an unsuccessful one, & more consumer information increases the chances of appropriate selection for a particular use. The consumer's knowledge of the nature of the fiber will give him some basis for predicting the performance associated with each of Durability, comfort & shape retention when used. Aesthetic properties are an indicator that the consumer decides according to his preferences & desires. Care or cleaning can be known through the cards accompanying the costume.

**\* The effect of the fiber type used on the performance properties:**

What is expected from most textile filaments when converted into woven fabrics, can be summarized & explained in the following table:

| Filament   | Durability          |          | Appearance |                |             |                    |
|------------|---------------------|----------|------------|----------------|-------------|--------------------|
|            | Friction resistance | strength | Absorption | Heat retention | Flexibility | Pilling resistance |
| Acetate    | Low                 | Low      | Average    | Average        | Average     | High               |
| Acrylic    | Average             | Average  | Low        | High           | Average     | Average            |
| Cotton     | Average             | Average  | High       | Low            | Average     | High               |
| Flax       | Average             | Average  | High       | Low            | Average     | High               |
| Glass      | Low                 | High     | Low        | High           | High        | Low                |
| Nylon      | High                | High     | Low        | Average        | High        | Low                |
| Polyester  | High                | High     | Low        | Average        | High        | Low                |
| Viscose    | Average             | Low      | High       | Low            | Low         | High               |
| Silk       | Low                 | Average  | High       | Average        | Average     | High               |
| Triacetate | Low                 | Low      | Average    | Average        | Average     | High               |
| Wool       | Average             | Low      | High       | High           | High        | High               |

**\* Preferred fibers for manufacturing apparel fabrics:**

There is a general tendency to prefer cotton in clothes, especially underwear, & clothes for vacations & trips, & there is a tendency to reject & not prefer synthetic fibers such as nylon, as the consumer, through his experience, was able to realize that nylon lacks comfort, which is also found by research & studies that Conducted in this regard, & when some statistical studies were conducted in Japan on women, it was found that women, in general, prefer natural fibers in their choice of clothes, & it was also found in another study that most women prefer cotton or blended blouses of cotton & polyester, while only 10% of those who preferred To achieve the same status as cotton because polyester & wool look better because there are no creases in the fabric. This is a

general trend & is not limited to one particular country, as it was found that consumers from other countries & with the wide variation in the degree of their education were almost in agreement on these according to the opinions previously put forward, although some studies have shown that choosing the appropriate composition for both fiber & fabric helps to manufacture clothing Comfortable is a kind of synthetic fibers & is similar in performance to those made from natural materials. Moreover, global studies conducted on the consumer by the Association of Thought & Opinion Researchers confirmed that the consumer searches for comfort first in clothing, as 85% of those who were studied chose comfort as the basis for choosing Their clothes. Cotton is, in general, its material preferred & desirable by many due to its enjoyment of providing comfort, as its material

cotton can breathe as a person breathes, & this swab allows moisture to evaporate & the air passes permanently through the cloth, so the cloth is comfortable, & the cotton fabrics have a good effect. On the skin, regardless of the temperature or humidity of the surrounding atmosphere. Also, cotton can keep moisture away from the body, & allow the arrival of cold temperatures outside the body, & therefore it is considered one of the raw materials that give a feeling of coldness & is used in the summer, although it is also possible to work Warm fabrics from it when needed to be used in the winter to give a feeling of warmth. More than 50% of women & 60% of men prefer cotton, especially in clothes that touch the body, & when two groups of consumers were asked, one in Newcastle & the other in Sydney, about the most suitable hairs that can be used. As shirts used for sporting purposes, their preference was for the materials specified for them (silk, cotton, polyester, nylon) in the following order according to their preference.

"Cotton, silk, polyester, & nylon" while their arrangement of these materials, when used in the manufacture of underwear, was as follows:

"Silk, cotton, polyester, nylon" This is for the English as for the Australians it was as follows: "Silk, polyester, nylon & cotton" In each case, the first favorite fabric is the closest to the ideal in its use for a specific purpose from the following filaments in the list As for the favorite among the Egyptians, the arrangement was as follows: "silk, cotton, polyester, nylon." While it was noted that cotton is the best to use as sports shirts, & silk was advanced to be the best used as underwear, due to its lightweight, softness, surface, softness & accuracy. It has been found that the fibers made from natural polyester, but they are treated much less than those made from industrial polyesters, are the most suitable & used, & even more corresponds to the requirements of use in the

garment industry & in general, the requirements of each final product are what make the consumer prefer a certain type. From the filaments, which is directly related to the ability of this type of filaments to meet the needs of the end-use performance of the product. (Svedova, Jarmila, 1990)

**\* The most preferred filament of all ages:**

The statistical analyzes that were conducted on all the filaments used with science proved that cotton is still the greatest & preferred influence of the consumer, & these statistical analyzes also proved that all the filaments used in the world, including cotton, are greatly & directly affected by economic factors & population sciences. All consumers in the world prefer cotton filament, which is considered the most productive, & the dem&for them will constantly increase. (Clothing and Textiles Curriculum Guide for Exploratory Homemaking Programs 1983)

**b) Upholstery Fabrics:**

Every consumer, whether in his home, store, or office, has a different opinion from the other in choosing the textile products necessary to complete the furnishing of the home, store, or office. While some of them build their optional judgments on the basis of the appearance & texture characteristics of textile products, we find some focus on the service related to performance & others focus on the useful life of the product & others care about the economic cost & so on.

**\* The basis for choosing textile products for upholstery:**

The following table shows the various foundations & characteristics that we take into consideration when choosing textiles for furniture, & in most cases, the consumer determines the importance of each factor or variable based on the personal decision:

|   |  |
|---|--|
| <b>Appearance</b>   | Shape & color, single color, multicolor, the size & shape of the decorative unit used, the space of repetition. Color characteristics, hue, intensity or strength Level of light reflection, level of light transmittance  |
| <b>Texture properties</b>   | Stiffness, degree of looseness, extensibility.<br>Texture: Smooth or dry, warm, cold, soft, itchy, the weight of the fabric. Stiffness, degree of looseness, extensibility. Texture: Smooth or dry, warm, cold, soft, itchy, the weight of the fabric.             |
| <b>Expected service</b>   | Functional properties: Isolation, low light intensity, noise control. Form retention: colorfastness, texture & surface effect retention of fabric, adhesive resistance, durability & wear resistance: friction resistance, tear resistance, dimensional stability. |
| <b>Required Maintenance</b>   | Cleaning: washing, dry cleaning, easy removal of stains, required total level, fast ironing, no need, severe ironing   |
| <b>Substitution &amp; replacement factors &amp; economic cost factors</b> | Needed in a short time or a large time. High or low.   |

**\* Fibers used in upholstery fabrics:**

Any quality of materials can be used in upholstery fabrics, provided that this material contains the durability & tensile strength necessary to resist the fabric to repeated tensile stresses when used, as well as the ability to resist sun rays, dry cleaning & in some cases also washing, wool, cotton, nylon, & polypropylene, maybe The best materials used in the manufacture of upholstery fabrics, as well as silk gives a sense of luxury, & must be used with great care & care, as well as rayon & acetate are cheaper & easier to care for. Rayon & acetate are preferred at home, & nylon is also one of the raw materials that are distinguished by their strength, resistance to friction & ease of cleaning. Although all fibers, regardless of normal conditions, are used in the work of upholstery fabrics, some moral studies have shown that the bulk of them in the market are made of cotton In fact, synthetic filaments appeared in most upholstery fabrics, & often the fabrics used as upholstery fabrics were also suitable for use as stair fabrics, & thus these products were classified as one type of the product, then the filaments used in the

manufacture of upholstery fabrics changed from Those used in the manufacture of stye fabrics, & since 1996 the use has changed from natural & synthetic cellulose filaments to industrial non-cellulose filaments. (Kadolph, Sara J. & langford, annal ,1993)

**c) Curtains & Wall Covering:**

When choosing a fabric to be used as a curtain, we must take into account the nature of the functions performed by the curtains, & the most important of these functions is to control the amount of light entering the room, heat insulation, reduce noise & provide a measure of personal freedom. Indeed, when choosing curtain materials, the main consideration is The important thing is the effect of sunlight on different types of filaments, & almost all fabrics are weakened somewhat by the sun's rays, & rayon has almost the same resistance to cotton against sunlight, while acetate is more resistant to sunlight than cotton, & sunlight has a harmful effect on both nylon & silk. While polyester & acrylic fibers have high resistance to sunlight, the following table shows the effect of sunlight on different types of filaments:

|                                    |           |             |         |
|------------------------------------|-----------|-------------|---------|
| Glass fibers                       | Excellent | Tri-acetate | Average |
| Acrylic                            | Excellent | Acetate     | Average |
| Polyester                          | Excellent | Nylon       | Average |
| Flax                               | Excellent | Wool        | Average |
| cotton                             | Excellent | Silk        | Weak    |
| Rayon viscose                      | Average   | Tri-acetate | Average |
| <b>Fiber Resistant to sunlight</b> |           |             |         |

Often non-cellulosic filaments are more common & used in curtain fabrics than any other quality, however, cotton, rayon, viscose & rayon acetate are also widely used, & about 60% of the curtains produced in the seventies were made of synthetic fibers & about 28% were made of cotton. & 12% were made of glass, but the percentage of cotton usage decreased & the use of glass fibers increased later. The properties of filaments have a real effect on the selection & use of fabric as curtain fabrics which are density, flexibility, toughness, sunlight resistance, chemical resistance, etc. As for the wall covering fabrics, they are Tissues used mainly to give the aesthetic form, or a specific functional purpose in the interior design, such as to isolate the external sound & noise, or to preserve the internal energy, & hence the choice of wall coverings is sometimes fulfilled for a functional purpose we desperately need, for example, the wall fabrics are given A solution or a measure of sound control measure, in other words, it is used as sound insulation, as mentioned above, & in the manufacture of this type of fabrics, natural or synthetic fibers are used for the requirements of the required performance

when in use. (Yeager , 1988)

**d) Floor Covering:**

The nature & importance of this type of fabrics is determined by personal preference, specialized recommendation, conditions of use, activity, etc., & floor tissues cannot be chosen according to their appearance or shape only, but we must also pay attention to the environment in which they are placed & close to them, in addition to giving us the required functional characteristics, Consumers resort to geotextiles for the purpose of saving energy & reducing noise, but also providing safety in the movement of people in addition to good visual vision. Cotton, wool, silk & synthetic fibers are used in carpeting, & today non-cellulosic fibers represent 99% of the fibers used in the manufacture of carpet hair & The remaining 1 % is distributed on wool, cotton & rayon. The most important properties required for flooring fabrics are that they are highly resistant to friction & resist microbes, fungi & mold. (The Carpet Primer, 2003)

**e) Industrial Textiles:**

Fabrics intended for industrial purposes have been involved in the textile industry since a long time



ago, & all of the fabrics intended for industrial purposes & any other quality of cloth are similar to each other in that each of them protects the person & meets his needs & requirements.

**\* Raw materials used in the production of textiles intended for industrial purposes:**

The beginning of the production of this special type of fabrics used both wool & linen, then was followed by the use of cotton, & in some cases silk was added to the raw material used, & this matter remained the same until the first half of the twentieth century when synthetic fibers began to spread commercially & began to solve Rayon viscose replaced most of these fibers due to its distinctive properties & high quality of performance. However, synthetic fibers showed a set of common properties that were not present in previous textile materials such as high tensile strength, elasticity, uniformity, chemical resistance, non-flammability, friction resistance, bending or twisting & many more properties. As a result of the emergence of these fibers, the field of use of fabrics intended for industrial purposes has expanded & expanded in all fields with high efficiency for all requirements that most of the previous filament were unable to fulfill. The main reason for the advancement & breakthroughs in the field of textile materials recently, as the fields of textile use have become beyond imagination Whether in the field of agriculture, industry, medicine, etc. In fact, the most important characteristic that prompted producers to use synthetic fibers in the field of tissues intended for industrial purposes is their resistance to chemical influences, & filament producers still present every day new in the field of producing many new types of Filaments with new specifications that meet the requirements of different industries.

**\* Properties & performance evaluation of fabrics for industrial purposes:**

Fabrics intended for industrial purposes are manufactured for specific requirements & required performance characteristics. & users for industrial purposes should evaluate their value from the functional properties of the fabrics in the requirements for final use, & that they be satisfied with the lowest performance level of these fabrics. Therefore, the properties required for this type

must be determined in the beginning. Fabrics, for example, we conduct a job analysis process for everything related to the required, & from here we find that the development of this type of fabrics always occurs as a result of continuous & permanent specialized dialogue between researchers & the users of these fabrics, & the job analysis gives information about what are the scientific or actual demands that are required to be provided for you. The consumer is satisfied with the product, & from it he derives the real properties required & more than that, the job analysis has to give in that one is a descriptive balance to evaluate the products given, & this job analysis must be based on a correct definition of the product's function & supported by complete & general models, & the job analysis relates to two aspects or Two bodies are:

Self-function analysis, meaning the definition of job requirements in order to meet or meet the needs of the product. Self-job evaluation, i.e. assessing precedence, determining or fixing the identity of the main function & the secondary function, & selecting product characteristics are evaluated or evaluated only on the basis of the job performance characteristics of a specific final requirement, & so on, for example in GEOTEXTILE the friction resistance is taken as a characteristic & not as a primary factor in the evaluation The product while in other types of fabrics intended for industrial purposes this property may be considered an important factor in performance.

**\* Classification of fabrics intended for industrial purposes:**

This type of fabrics can be defined as those textile products designed for use in industry & other sectors of the global economy, or they are the fabrics that are used as part or a major factor in the material industry. These products may be found in multiple markets & fields, & the dem& for them has increased greatly in all the sectors include agriculture, civil engineering, electrical engineering, transportation, & tunnel stations, in addition to some water services, storage, sports, medical & health services, & many other fields.

**\* Classification of synthetic fabrics may be done on more than one basis:**

|                                       |   |
|---------------------------------------|---|
| 1- On the basis of raw materials.     | 4- On the basis of production technology & final applications.  |
| 2- Based on the manufacturing sector. | 5- On the basis of groups of fabrics intended for industrial purposes with specific uses & future requirements. |
| 3- Based on the final requirements.   | 6- On the basis of different points of view.  |

The classification of these fabrics according to the type of raw fibers used in them, is an open classification, because the creation of some modifications & changes in the properties of synthetic fibers is still an ongoing matter until now to develop & update them & add new features & properties to them, which improves their performance style, & accordingly the classification of fabrics for industrial purposes according to the materials The raw material manufactured from it will be a deficient or wrong necessity, as it is expected & expected that a major change & development will occur in the raw materials used according to the new discoveries in the world of chemistry & the continuous successful progress in the fiber sector. By choosing the appropriate material for the purpose of performance. (Satish Kumar V. B. Gupta, 1992)

**a) Tent Fabrics & Canvas:**

Canvas represents the vast majority of fabrics intended for industrial purposes, & in the past & still in some examples until now they were made of linen, kenaf & hemp fibers, & with the advent of synthetic fibers & plastics, synthetic fibers began to enter the manufacture of these types of fabrics, & most Canvas fabrics became manufactured from fibers. Synthetic, however, Canvas fabrics made from natural fibers still retain their market share, as they have certain special characteristics such as air permeability, while those made from synthetic fibers are not completely air-permeable. On the other h&, new types of Canvas fabrics find It is very popular in all areas of human activity, & it is often made of nylon & polyester, as well as acrylic & polypropylene. For example: In the field of agriculture: (warehouses, shouns, agricultural centers & greenhouses) In the field of civil engineering: in industry, transportation, transportation, health services, & the final processing of these fabrics is very important, & with the use of synthetic fibers, they give the product high tensile strength & the ability to resist consumption, which works to develop the final requirements of the product. In fact, woven fabrics designed for external requirements (umbrella fabrics) must meet the quality requirements strictly, as they are directly exposed during use to various weather factors, & they must have the ability to withst& these different influences. This means that we must take care of some The properties of these products such as adequate tensile strength, low weight, water resistance,

dimensional stability, & friction resistance, in addition to having good resistance to mold & fungi, & the synthetic fibers used in the manufacture of this type of product are able to meet all the performance requirements necessary for product efficiency. If we use natural fibers, we can reach the necessary performance requirements by increasing the number of both warp & meat, to increase the tensile strength of the product, & use different processing methods to make the fabric resistant to water, mold & fungi. From all of the above we conclude that the evaluation of the quality component in these br&s from the fabrics it comes based on the weight of the wiper unit, tensile strength, tear & elasticity, dimensional stability, resistance to high & low temperature, fire resistance & changes due to atmospheric influences.

**b) Filter fabrics:**

Filter fabrics represent another important group of fabrics intended for industrial purposes, as they are found in various industrial sectors. Filter fabrics must have good mechanical tensile strength & resist friction. Also, good filtration properties, allowing a passage or path free from any obstacles to the filtered liquid or gas Also, it must have the ability to retain foreign materials & impurities, be easy to clean, & it must be deformed or spoiled under the influence of any pressure, & it must also be easy to h&le, resistant to heat & chemicals, & so on. The use of natural fibers in the manufacture of woven filter fabrics such as cotton For a long time, linen & hemp, & despite the tremendous progress in filter fabrics made of synthetic fibers & their many advantages, it is still manufactured until now filter fabrics made of natural fibers, & is used in old filtration systems to replace the filters that have been consumed, & is also used in some Special filtration requirements that filters made of synthetic fibers may fail to perform their tasks with high efficiency, due to the smoothness of their surface. However, the production of filter fabrics made of natural fibers is in a continuous decline, & recently, only cotton is used for this purpose. On the other h&, progress & prosperity in the field of synthetic fibers has caused revolutionary changes in the manufacture of filter fabrics, as the excellent mechanical, physical & chemical properties of these fibers have enabled us to reach high performance properties in filtration processes.

**\* The advantages of industrial filter fabrics are the following:**

|   |  |
|---|--|
| 1. Reduces the weight of the fabric due to the high tensile strength of the material. | 2. Ease of h&ling during the replacement process in the filtration system. |
| 3. Easy separation filtration disc from   | 4. Efficient rinsing & washing of filter fabrics.                          |



|   |   |
|---|---|
| the woven filter cloth.   |   |
| 5. Easy & fast drying.  | 6. More filter clarity & improved hygiene conditions of filtration processes.   |
| 7. Complete rot resistance.   | 8. High filtration rate.  |
| 9. Excellent abrasion resistance & minimal risk of loss & damage.   | 10. The ability to filter chemicals.  |
| 11. All these factors help to increase the life span of the filter by 10: 15 times as compared to conventional filters. | 12. It is used in most sectors of the global economy, such as sugar industry, beer & wine industry, dairy industry, distillation industry, mineral oil industry, starch industry, soap condensate industry, ghee manufacturing processes, chemical industry, paper & cellulose industry, etc. |

filter fabrics, emphasize the importance of the structural composition, because the filtering efficiency is the basic characteristic that determines the final & basic requirement in the filter cloth, which comes only from the mere selection of the appropriate fiber. (S. Chaudhari, Milind Sankhe, 2003)

**c) Textiles for rubber & plastics:**

The fibers used in these industries, special & somewhat important, & the most important use of the manufacture of belts, especially those used in mines, agriculture & civil engineering, & in other industrial sectors. One of the most important factors in the quality of the conveyor belts is its Hysteresis convex properties, which show the ratio between flexibility, kneading or plasticity, under conditions in the case of conveyor belts, this ratio must always be constant, so that kneading is minimal. (Nokian Tyres PLC, ,2015)

**d) Textiles for Leather Industry**

Leather industries occupy a relatively large sector, which can consume all the tissues intended for industrial purposes. They are used in the lining of the sole of shoes & various linings of bags. With the increasing population growth, natural materials such as leather are no longer sufficient to cover the required needs, so we resort to industrial tissues to fill the gap between What is needed & what is available, it will continue to exp& & exp&, as long as there is a continuation in the manufacture of synthetic fibers, & a high efficiency in the formation of the woven. (Erminia D'Itria, 2017)

**e) Geotextiles:**

Ground or soil filtration is one of the most important practical applications of Gotextile fabrics, &the non-woven structural composition of this type of fabric is the prevalent &widespread method for classifying it, due to its high porosity, inflation, &the ability to trap dust &impurities in the cloth itself. There are two other very important characteristics in the field of Geotextile fabrics, which are the effect of insulation &reinforcement, which we can achieve by coated canvas. Since Geotextile fabrics are mainly designed for use as a

filter for the ground or soil, this type of fabrics has the ability to protect the ground from the strength of the pressure &flow of the sea, &that it filters the soil, also help to impede &prevent unwanted submersion. Also, it must show adequate permeability, in a sustainable &constant manner &at the same time give an outlet for the drainage of water leaking from the ground (drainage performance). For all of the above, this type of fabrics needs materials with high efficiency in filtration processes, so that they are strong enough, &have the ability to resist the influence of moisture &chemicals exposed to it in the ground &soil. (Bipin Agrawal, 2011)

**f) Packaging Fabrics (cover work):**

In the past it was common to use woven jute fabrics in making packages, but the rise in the price of jute led to the search for an allowance or substitution for the use of these filaments in the packaging sector &it has been successfully replaced by some new materials, especially polyolefin tapes, &plastic has replaced textile materials in The packaging sector in a large way, as it was found that plastic (sometimes) is more capable &suitable to achieve its purpose, in addition to its cheap price, but this does not mean that they have completely dispensed with jute, but resorted to mixing jute exhaust with other types of filaments, to make Synthetic fibers then entered this field due to their high performance properties, &they may be mixed with other natural materials. In any case, the traditional production method for the design &quality of these packages must be modified to suit certain properties of these new materials. For example, in the manufacture of bags, it was found that the knitting method is superior to all other methods, as it gives a productivity ten times higher than the woven method. Non-woven fabrics were used in this sector, &it was found very suitable for it, as the packaging gives high durability &flexibility, in addition to the attractive appearance &acceptable price. (Dhandapani Saravanan,D.C. Sharma, 2005)

**Manufacture of ropes, hoses & tubes:**

The physical, mechanical & chemical properties of the ropes are determined by the properties of the raw materials used in their manufacture. These raw materials may be natural, such as flax, hemp, jute & sisal, or synthetic fibers such as nylon & polyester, & the performance properties of ropes, cables & ship berths are also affected by the production method used (such as twinning & braiding) & by changing these previous factors, it is possible to change the performance characteristics according to the end-use requirements. Hoses & tubes made of textile fabrics have become increasingly important, & deserve to be considered, due to their properties such as low weight, increased durability, resistance to microorganisms, & ease of handling, which has created unprecedented end-user requirements. & textile tubes can replace metal tubes, & its manufacture of synthetic fibers provides it with the high tensile strength needed to raise its performance efficiency. From all of the above, we find that it is difficult today to find a field or a field for human activity, in which fabrics intended for industrial purposes are not used or in which we must bear in mind that the raw materials used in this sector are not limited to natural & synthetic fibers, but for a while. Not far away, glass fibers have begun to occupy a rather large position in this sector, due to their high tensile strength, fire resistance, etc. Manufacturing. On the other h&, due to the resistance of filaments & their long service life, the curtains made of fiberglass are now widely used, especially in theater & cinema curtains & partition walls, & all this distinction of glass materials also applies to polypropylene as well. The multiplicity of raw materials & the multiplicity of their properties, features & specifications allow a careful selection & the ideality of raw materials that provide & meet the needs & requirements of a specific process, final use & a specific environment. (J.J. Evans, I.M.L. Ridge, 2005)

### Results:

The research results are summarized in the following elements:

- 1- Ensuring proper quality of the raw material of the product to achieve the functionality of the most important quality requirements.
- 2- Carefully choose the appropriate material to meet the needs & requirements of job performance.
- 3- Dem & for synthetic fibers & raw materials is increasing due to their advantages such as tensile strength, fire resistance, & others.
- 4- Ease of raw materials & the manufacture of synthetic fiber has led to its use in many

sectors such as civil engineering, ships & hardware manufacturing, transport & communications.

- 5- The lightweight of synthetic fibers gave it a major advantage over the rest of the raw materials, in manufacturing in various fields such as cars, airplanes, curtains for theaters, cinemas & other synthetic sectors.
- 6- The tensile strength & the tolerance of consumption of synthetic fibers led to their use significantly in agricultural industries such as greenhouses & others.

### Recommendations:

- 1- The need to be patient in choosing the material to be used in the product to achieve functional performance.
- 2- The need to commit to using the appropriate materials for each product to meet the requirements of the product to increase the level of quality.
- 3- Exp&ing the establishment of production centers for raw materials & synthetic fibers due to their industrial advantages used in many industrial sectors will lead to an increase in the employment rate for the youth & work to increase the material economic return of the state.
- 4- Opening production centers for different industries that are the materials used from the production of raw materials production centers, which are the feeder for industrial production centers locally.
- 5- Increasing the investment of the state, businessmen & foreign investors in this sector is working to open a large market in the region & compete locally & internationally.

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