

A comparative study between hank dyeing and piece dyeing in Chanelia upholstery fabrics

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Abstract

The research aims to perform a comparative study between hank dyeing and fabric dyeing in chenille upholstery fabrics. By comparison between samples of Chenille fabrics produced by hank dyeing and piece dyeing and with the difference in the used weaving techniques (simple spot design-double- double cohesive). Change number of picks (16picks/ cm -24 picks / cm – 32picks/ cm) and change arrangement picks (1 picks polyester: 1picks Chenille - 1 picks polyester: 2picks chenille -1 picks polyester: 3picks chenille). Tests were done to the produced samples (weight test –strength - tensile test and elongation test - stiffness test) it was found in the statistical analysis of the test results, it was found that the double weaving structure and the number of 32 picks / cm achieved the highest weight of the fabric for hank dyeing, and the double cohesive weaving structure and the number of 32 picks / cm achieved the highest fabric weight in piece dyeing. The simple spot design cohesive weaving structure and the number of 32 picks / cm achieved the highest fabric weight in warp, weft to piece dyeing as well as of the warp only in hank dyeing, but the weft, the double cohesive weave and the number of picks are 32 picks / cm. The simple spot design weaving achieved the highest elongation in both executive styles and for the number of 32 picks / cm in warp, but the double achieved the highest elongation in hank dyeing at 24 picks / cm in weft and piece dyeing at 16 picks / cm. However, the installation of the regular pattern achieved the highest hardness at 32 picks / cm in the executive method, hank dyeing, but the double cohesive achieved number of 32 picks / cm in piece dyeing.

Key words

Jacquard fabrics- Upholstery fabrics- hank dyeing- piece dyeing

Introduction:-

Upholstery fabrics are considered one of the important qualities that the textile industry produces and presents to the consumers, and in its field of production generally has a great deal of accuracy and care for what it should have in terms of performance and appearance in proportion to its use. ⁷⁶

Upholstery fabrics differ in their nature in terms of their design and production from other types of fabrics. This difference is due to a set of specific main factors related to the nature of the use of that type of fabrics.

General division can Upholstery fabrics:-

1-Floor Upholstery: These Upholstery are responsible for covering floors of a place.

1-1- Arab seats

1-2- Carpets

2- Wall Upholstery: It is responsible for covering walls.

2-1-Pendants

2-2-Curtains

3- Furniture Upholstery: It is responsible for covering the furniture that the house contains, including ⁸³

3-1- Table linens

3-2- Seat covers

3-3- Bed covers

4- Upholstery Supplements: They are complementary parts to the room Upholstery according to their type. ⁸⁰

4-1- Towels.

4-2- Pillows.

4-3- Lamp covers

Research problem:-

-The scarcity of studies based on a comparison between hank dyeing and piece dyeing.

- Difficulty in predicting the effect of hank dyeing on the functional properties of upholstery fabrics.

Research importance:-

- Its importance lies in knowing the best operational techniques and weaving compositions in the production of chenille upholstery fabrics.

Research aim:-

- The production of upholstery fabrics with an aesthetic and functional vision.

Research hypothesis: -

- The use of weave in the manufacture of upholstery fabrics affects the aesthetic and functional aspects of it.

Research limits:-

The weave:-(simple spot design-double- double cohesive)

Textile materials(cotton-polyester)

The machine used (Jacquard machine)

Executive style(hank dyeing - piece dyeing)

Research Methodology:-

The research follows the experimental analytical method.

1- Theoretical Framework

-1-1 Operation method:

1-1-1- Hank dyeing

It is the process of dyeing the strings after the spinning process, and it is in the form of a shell or as a soft, then it is re-wrapped on a hard after the process of dyeing, spinning and drying, to be used as warp threads or colored wefts, and the fabric produced in this way takes place for a final processing operation.

1-1-2- Piece dyeing

It is a process in which the fabrics are dyed after being weaved with raw threads, whether these fabrics are of a single raw material or mixed, so the unmixed fabrics are dyed in one basin, while the mixed fabrics are dyed in two basins according to the nature of dyeing each ore.

2-1 weaves

We find that the textile composition affects the standards of the use of fabrics as well as it affects the properties of the fabrics, whether aesthetical or functional. For example, simple fabrics produced by the method of texturing the composition of the plain allows obtaining a variety of effects in texture and colors and is characterized by high durability and ability to resist stress.

2-1-1 Simple spot design:- The textiles executed in this way are considered one of the simplest types of fabrics that do not need any preparation and include one color of warp yarns and the weft yarns are either one or several colors, and by increasing the weft colors, the number of basic colors increases, through which the possibility of obtaining multiple color effects increases.

2-1-2 Double:- It is a method different from the normal operating methods, so we find that the double fabrics are a textile structure resulting from the operation of two layers (two fabrics.)

2-1-3 Double cohesive:- It is the double-layer style, but cohesion is achieved by making the two fabrics (the two layers) adhere to each other in order to become one cloth that cannot be separated.

Number of yarn:-

Which was used	Warp-150 Lined polyester	
	Weft:- Chenille:- 4.5metric Polyester:-300 Denier	
	warp	66 yarn/ cm
	Weft	16 picks/ cm –when arrangement of picks 1 yarn polyester;1 yan Chenille

	weft	24 picks/ cm –when arrangement of picks 2 yarn polyester;1 yan Chenille
		32 picks/ cm –when arrangement of picks 3 yarn polyester;1 yan Chenille

Experimental work:-(weight test –strength - tensile test and elongation test - stiffness test)

Experimental chart

test	The standard in which the test is performed
Weight(gm/ m ²)	ASTM D3776 -09 “Standard Test Methods for Mass Per Unit Area (Weight) of Fabric”
Strength - tensile test and elongation (Newton)	ASTM D5034 -09 (2013) “Standard Test Method for Breaking Strength and Elongation of Textile Fabrics (Grab Test)”
Stiffness (Newton)	ASTM D4032-08 “Standard Test Method for Stiffness of Fabric by the Circular Bend Procedure”

Results and discussion

Results of fabric weight (hank dyeing) in grams / m² for textile compositions and different picks densities:- The results showed that when the number of picks was 32 picka / cm, the double weaving combination achieved the highest weight of the fabric. It is evident that in this case the highest fabric weight compared to other operational methods, due to the fact that increasing the number of picks increases the weight of the fabric.

Results of fabric weight (dyeing piece) in grams / m² for textile compositions and different picks densities:- The results showed that when the number of picks was 32 picka / cm, the double cohesive weaving combination achieved the highest weight of the fabric. It is evident that in this case the highest fabric weight compared to other operational methods, due to the fact that increasing the number of picks increases the weight of the fabric.

Results of tensile strength (hank dyeing) in the direction of the warp (in Newton) at different weaves and weft densities:- The results showed that when the number of picks was 32 picks / cm, the simple spot design achieved the highest strength of the fabric for hank dyeing in the direction of the warp. This is because the increase in the number of picks increases the durability of the fabric.

Results of tensile strength (piece dyeing) in the direction of the warp (in Newton) at different weaves and weft densities:- The results showed that when the number of picks was 32 picks / cm, the simple spot design achieved the highest strength of the fabric for piece dyeing

in the direction of the warp. This is because the increase in the number of picks increases the durability of the fabric.

Results of tensile strength (hank dyeing) in the direction of the weft (in Newton) at different weaves and weft densities:- The results showed that when the number of picks was 32 picks / cm, the simple spot design achieved the highest strength of the fabric to dyeing piece in the direction of the weft, because the increase in the number of picks increases the durability of the thread, as well as the style of the regular pattern and that the fabric is one layer, this leads to an increase in durability.

Results of tensile strength (piece dyeing) in the direction of the weft (in Newton) at different weaves and weft densities: - The results showed that when the number of picks was 32 picka / cm, the double achieved the highest strength of the fabric for piece dyeing in the direction of the weft This is due to the fact that increasing the number of picks increases durability

Results of elongation (hank dyeing) (%) in the direction of the warp (in Newtons) at different weave and weft densities, the results showed that when the number of picks was 32 picks / cm, the simple spot design achieved the highest elongation of the fabric to hank dyeing in the direction of the warp, this is due to the fact that 3 polyester yarn are in proportion to the Chenille yarn. This increases the elongation of the fabric because this increases the freedom of movement of the threads.

Results of elongation (dyeing piece) (%) in the direction of the warp (in Newtons) at different weave and weft densities: The results showed that when the number of picks was 32 picks / cm, the simple spot design achieved the highest elongation of the fabric to hank dyeing in the direction of the warp, this is due to the fact that 3 polyester yarn are in proportion to the Chenille yarn. This increases the elongation of the fabric because this increases the freedom of movement of the threads.

Results of elongation (hank dyeing) (%) in the direction of the weft (in Newtons) at different weave and weft densities: The results showed that when the number of picks was 24 picks / cm, the double achieved the highest elongation of the fabric to hank dyeing in the direction of the weft, this is due to the fact that 2 polyester yarn are in proportion to the Chenille yarn. That increases the freedom of movement of the threads, and the double-layer method of the cloth is two layers, thus allowing the freedom of movement of the threads.

Results of elongation (dyeing piece) (%) in the direction of the weft (in Newtons) at different weave and weft densities: The results showed that when the number of picks was 16 picks / cm, the double achieved the highest elongation of the fabric to hank dyeing in the direction of the weft.

Results of fabric hardness (picks dyeing) (in Newton) at different textile compositions and weft densities: - When the number of picks was 32 picks / cm, the weaving simple spot design achieved the highest fabric stiffness, and that is because it is the highest number of picks, which leads to an increase in the stiffness and cohesion of the fabric in addition to the style of the simple spot design, and that one layer of cloth increases the cohesion of the cloth.

Results of fabric hardness (dyeing piece) (in Newton) at different textile compositions and weft densities, when the number of flywheels was 32 inch / cm, the double cohesive weave achieved the highest fabric stiffness because it has a higher number of picks, which leads to an increase in the stiffness and cohesion of the fabric

We conclude from the analysis of all the study samples that the best samples studied in the case of hank dyeing - the density of a weft was 32 - by simple spot design. The best samples under study are in the case of piece dyeing - the density of a weft was 32- with a simple spot design and it's the absolute best.

Recommendations:-

- 1- Study the many characteristics that should be available in upholstery fabrics.
- 2-Attention to developing specifications and methods of implementation. Creating upholstery fabrics that keep pace with the requirements of the times.
- 3- It is recommended to use more methods of implementing multiple textile compositions to make comparisons between hank dyeing and dyeing piece.

References:

- subraa .muhamad .aqmshat alaistikhdam almunzilaa waldiykur aldakhla . matabie nubar dijital - alqahiruh -2015
- zahir.mustafaa .altarakib alnasjiat almutatawirat - dar alfikr aleurbaa - alqahirah - altabaeuh al'uwlaa
- halaw.asamt eizi aldiyn .tknulujia 'iintaj aqmsht aljakar - kuliyyat alfunun altatbiqiat - altabeuh al'uwlaa – misr-2010
- fatahaa mahmud 'ahmad - wakharun - altarakib alnasjiat watahlil aleayinat - sunduq daem sinaeat alghazl walnasij-2004-
- aljamal .muhamad eabd allah - al'usus aleilmiat walfaniyat fa altarakib alnasjih aljuz' alththanaa -dar alaslaml liltabaeat walnashr - almansurih-2002
- alhaddad.sedyt mustafaa .almlabs almanziliat walmafrushat - kuliyyat altarbih alnuweiuh - al'iiskandaria-2005
- faraghlaa .zinat eabd alhafiz - almafrushat almanziliat waikhtiaruha watanfidhiha – alqahiruh-2010
- ridwan.jimal eabd alhamid - alaistifaduh min nazarat 'usus altasmim fa tatwir qudrat almusamim alaibtikariat li'iintaj bed aqmsht almafrushat - kuliyyat alfunun altatbiqiyuh - jamieah hulwan- risalat dukturah -2003
- mahmud .maruh yasin .alqim aljamaliat lilmadrasat altathirihih walaistifadih minha fa tasmim aqmsht mafrushat maeasirih tusalih lilfanadiq walquraa alsiyahiat - kuliyyat alfunun altatbiqiyuh - jamieah hulwan- risalah majstir-2015
- hamid albaylaa .wala' muhamad - alaistifadat min eawadim alkhuyut fa 'iintaj aqmsht mafrushat dhat tathirat nusjiat jamaliat - kuliyyat alfunun altatbiqiyuh - jamieah hulwan- risalah majstir-2005
- mahmud 'abu alella .shyma' muhamad - dirasat muqarinuh bayn al'asalib altanfidhiat wadamjiha wa'athariha ealaa alnnahiat aljamaliat walwazifihih litasmim aqmasht altnjyd- - kuliyyat alfunun altatbiqiyuh -jamieah banha - risalat majstir -2020