International Journal of Recent Technology and Engineering (IJRTE)
ISSN: 2277-3878 (Online), Volume-8 Issue-4, November 2019

Assessment of Seam Properties of Ahimsa Silk Union Fabrics

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Abstract: ***Sustainable fashion is not merely a short term trend but it could last many seasons and for generations to survive on the earth. Silk fiber is the most beautiful natural fiber known as the "Queen of Textiles". Ahimsa silk is a non-violent, eco-friendly and sustainable process of the production. Hand spun and hand woven cotton fabric is another model of sustainable fabrics. Therefore, union fabrics in different ratio viz. 33:67, 50:50 and 67:33 were prepared from cotton with Ahimsa (Eri) silk and Conventional (Muga and Tussar) silk yarns. Objective of the study was to assess sewability parameters of union fabrics. These fabrics were tested for their seam puckering, seam stiffness and seam thickness parameters. The results indicate that union fabrics produced by Ahimsa silk with cotton were compatible to the union fabrics produced by Conventional silk with cotton yarns in their sewability parameters, so these should be preferred for construction of various fashion garments and textile products.***

Keywords: Ahimsa silk, conventional silk, cotton, sewability parameters and union fabrics.

I. INTRODUCTION

Today's world is progressively more environment conscious and natural clothing lifestyles are trending. The preference towards eco friendly textile alternatives and the appearance of innovative fabric is vivid. Today's growing concerns are health and environmental awareness which is reflecting on renewed interest in plant and animal fibers. The hunt is on for ecologically responsive fabrics.

Silk is a natural fiber made of protein filaments. It is known as "Queen of textiles" due to its luxurious, elegant luster and comfort. The traditional process of silk production involves killing of thousands of pupae by boiling cocoons. Majority of the consumers who enjoy glory of the lustrous silk are not aware of boiling cocoons to unwind the silk from the cocoons. The production of Ahimsa silk allows the adult moths to emerge alive from the cocoons and then the open ended or pierced cocoons are spun into silk yarn. Due to their creation in the wild or from these are called Ahimsa silk yarns.

Manuscript published on November 30, 2019.
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Hand spun cotton fabric can be said to be "eco-friendly" and hence increases its extent in the fashion world. Cotton fabric today represents an exquisite, heritage product, which is 'ethnic' as well as 'ethical'. Hand spun cotton is totally handcrafted and containing natural fibers, this natural flavor offers ample scope for fashion statement for the creative expression of fashion designers.

Sewability can be defined as a process by which two-dimensional a fabric is converted into three dimensional garments by assembling different pattern pieces together. This transformation mainly accomplishes with sewing process. The quality of any apparel is primarily depends on fabric quality and fabric sewability. The ease of formation of shell structure and the ability of material to be seamed effectively without any damage in fabric is defined as sewability. Sewability also provides suitable end-use performance. This study provides the information of sewability parameters of union fabrics made of Ahimsa (Eri) silk, Conventional (Muga and Tussar) silk with hand spun cotton. Testing is the most important aspect for monitoring and evaluation of textile quality. The study provides a deep insight into various sewability parameters of Ahimsa silk fabric itself and its compatibility with regular silk fabric.

II. OBJECTIVES OF THE STUDY

A. The objectives of the present study are:

- To prepare union fabric of Ahimsa silk (Eri) and conventional silk (Muga and Tussar) yarns with hand spun cotton yarn in different ratios.
- To assess sewability parameters of the prepared Ahimsa and Conventional silk union fabrics.

III. MATERIAL AND METHOD

The study was undertaken to evaluate union fabrics of Ahimsa (Eri) silk; Conventional (Muga, Tussar) silk with hand spun cotton yarns. The yarns were woven in ratio 33:67, 50:50 and 67:33 in warp and weft way with plain weave for fabric construction with 48 reed count. The union fabrics were constructed on fly shuttle hand operated loom at Weavers Service Center, Jaipur. Nine different plain woven union fabric samples were produced for the purpose of study. After weaving of the Ahimsa silk union fabrics, the fabric samples were tested to determine their sewability parameters. The sewability parameters of Ahimsa (Eri) silk and Conventional silk (Muga and Tussar) union fabric were assessed. Cotton with Ahimsa (Eri) silk and Conventional (Muga and Tussar) silk union fabrics were tested for their properties before seam production. In order to analyze the sewability parameters, fabrics were sewn**.** Sewability parameters assessed were:

A. Selection of sewing specifications:

Table I: Standard test methods of the sewability parameters measured

Sewability parameters	Standard test Methods
Seam puckering	ASTM 1683 -04
Seam stiffness	DIN EN ISO
Seam thickness	DIN EN ISO

ASTM 1683–04 method assert that fabric weight of Ahimsa silk and Conventional silk union fabrics were below 270 (g/m^2) then stitch density was (12+1/2 stitches per inch) and needle size was 14 in singer system as a standard for seam preparation for the seam strength test.

Table II: Specifications for Seam Construction

Stitch type	Lock stitch 301
Seam type	SSa-1
Needle size in singer system	14
Stitch density/inch	(12+ ½ stitches per inch)
Stitch length/mm	3
Sewing thread size	Polyester- core spun (Tex 40)

Tested samples were sewn by using sewing machine with YSC-8260 and 4000stitch/minute.

B. Preparation of specimens:

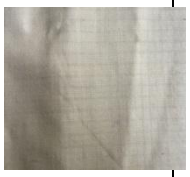
Table III: Specification of Lock Stitch Machine

Features	
Machine Name	High speed lock stitch machine
Country of Origin	China
Company Name	Typical
Machine Speed	4000
Stitch Class	300
Number of thread	2 (1needle thread, 1 bobbin thread)

IV. RESULTS AND DISCUSSION

The present study has been undertaken to assess and compare the sewability parameters of the prepared Ahimsa and Conventional silk union fabrics. The present study was conducted to develop union fabrics using different ratio of cotton and silk yarns and to assess sewability parameters of Cotton with Ahimsa (Eri) silk and Conventional (Muga and Tussar) silk union fabrics.

Table IV: Samples of Ahimsa and Conventional Silk Union Fabrics

Samples/Blend Ratio	33:67	50:50	67:33
Cotton : Eri			
Cotton : Muga			
Cotton : Tussar			

The union fabrics prepared by Ahimsa and Conventional silk yarns with Cotton hand spun yarns in three different ratios viz. 33:67, 50:50, and 67:33, for the purpose of study, have been shown in above table.

A. Assessment of Sewability Parameters of Ahimsa and Conventional Silk Union Fabrics.

Table V: Seam Puckering of Prepared Union Fabrics

Seam puckering (%)			
Union fabrics/Blend ratio	**33:67**	**50:50**	**67:33**
Cotton : Eri	4.98	4.85	0.42
Cotton : Muga	6.42	5.43	0.91
Cotton : Tussar	10.45	6.85	6.04

The results shown that Cotton : Eri 67:33 gives the minimum seam puckering (0.42%) and Cotton : Tussar 33:67 shows maximum value of seam puckering (10.45%). Seam puckering of Cotton : Eri is minimum as compared to Cotton : Muga and Cotton : Tussar union fabrics because of weight of fabric. High weight of the fabric turns in to less seam puckering.

Table VI: Seam Stiffness of the prepared Union Fabrics

Seam stiffness (cm)			
Union fabrics/Blend ratio	**33:67**	**50:50**	**67:33**
Cotton : Eri	21.58	23.56	25.22
Cotton : Muga	29.60	29.60	21.44
Cotton : Tussar	26.87	29.84	27.64

The above table shows that Cotton : Tussar 50:50 has the highest seam stiffness (29.84cm). The lowest seam stiffness value is (21.44cm) seen in Cotton : Muga 67:33. It can be observed that Cotton : Tussar and Cotton : Muga indicate higher seam stiffness because of weight of fabrics. Cotton : Eri has higher weight as compare to other union fabrics that the reason the seam stiffness of the fabrics is low.

Table VII: Seam Thickness of the Prepared Union Fabrics

Seam thickness (mm)			
Union fabrics/Blend ratio	**33:67**	**50:50**	**67:33**
Cotton : Eri	1.07	1.03	1.04
Cotton : Muga	0.94	0.93	0.98
Cotton : Tussar	0.89	0.92	0.89

The above table depicted that seam thickness of all the prepared union fabrics. Union fabric Cotton : Eri 33:67 found the maximum seam thickness (1.07mm) followed by the lowest seam thickness value of 0.89mm seen by Cotton : Muga 67:33 and Cotton : Tussar 33:67 union fabric.

V. CONCLUSION & FUTURE WORK

Nowadays an eco-friendliness of textile products becomes a key concentration not only in development of the textile industry but also for product end-users who are aware of environment conservation and human protection regarding the use of textile products. On the basis of results, it can be observed that developed union fabrics in three different ratio 33:67, 50:50 and 67:33 indicate results regarding sewability parameters. Cotton : Muga and Cotton : Eri union fabrics found the highest seam thickness as compared to other union fabrics. Cotton : Eri union fabrics also showed minimum seam pucker. Cotton : Eri union fabrics showed good sewability parameters as compared to Cotton : Muga and Cotton : Tussar union fabrics. Hence, it can be concluded the Cotton : Eri union fabrics is better with respect to sewability parameters. Therefore, these Ahimsa silk fabrics can be replace the Conventional type of silk fabric for the sake of eco-friendliness and sustainability. These provide a very good nonviolent alternative for the elegance and richness of violent silk material for ethically conscious consumers. Cotton : Eri union fabrics best suited for making diversified products such as tops, dress, kurti, shirt, cushion cover, jackets and stole. Therefore developed union fabrics will create a variety in fabrics types and cater to the present fashion world.

The information on sewability parameters of Ahimsa (Eri) silk, Conventional (Muga and Tussar) silk with hand spun cotton union fabrics will help in enhancing the quality of the fabrics. Since Ahimsa silk union fabric is an eco friendly it can be explored further. This study can be helpful to fabric manufactures, weavers and fashion designers for product development.

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