

UNIVERZITET U NIŠU / UNIVERSITY OF NIS
Tehnološki fakultet, Leskovac / Faculty of Technology, Leskovac

ZBORNİK RADOVA
XII SIMPOZIJUM
«SAVREMENE TEHNOLOGIJE I PRIVREDNI RAZVOJ»
PROCEEDINGS
12th SYMPOSIUM
«NOVEL TECHNOLOGIES AND ECONOMIC
DEVELOPMENT»

Leskovac, 20. i 21. oktobar 2017.
Leskovac, October, 20-21, 2017.

Izdavač: Tehnološki fakultet, Leskovac
Publisher: Faculty of Technology, Leskovac

Za izdavača: prof. dr Ljubiša Nikolić
For the Publisher: Prof. Ljubiša Nikolić

Urednik: prof. dr Miodrag Lazić
Editor: Prof. Miodrag Lazić

CIP – Каталогизacija u publikaciji – Narodna biblioteka Srbije, Beograd

6(082)(0.034.2)

СИМПОЗИЈУМ "Савремене технологије и привредни развој" (12; 2017; Лесковац)
Zbornik radova [Elektronski izvor] / XII simpozijum "Savremene tehnologije i
privredni razvoj", Leskovac, 20. i 21. oktobar 2017. ; [organizator] Tehnološki fakultet,
Leskovac ; [urednik Miodrag Lazić] = Proceedings / 12th Symposium "Novel
Technologies and Economic Development", Leskovac, October, 20-21, 2017. ;
[organized by] Faculty of Technology, Leskovac ; [editor Miodrag Lazić]. – Leskovac :
Tehnološki fakultet = Faculty of Technology, 2017 (Leskovac : Troters Kopi). – 1
elektronski optički disk (CD-ROM) ; 12 cm
Sistemski zahtevi: Nisu navedeni. – Nasl. sa naslovne strane dokumenta. – Radovi na
srp. i engl.jeziku. – Tiraž 150. – Bibliografija uz svaki rad. – Rezime na engl. i srp.
jeziku uz svaki rad.

ISBN 978-86-89429-25-1

1. Технолошки факултет (Лесковац)

а) Технологија – Зборници б) Технолошки прогрес – Привредни развој –
Зборници

COBISS.SR-ID 247796236

Štampa/ Print: Troters Kopi, Leskovac, 2017.
Tiraž / Printing : 150

Lektori: Biljana Mitić Stanković i Miljana Stojković Trajković
Proofreaders: Biljana Mitić Stanković and Miljana Stojković Trajković

ISBN 978-86-89429-25-1

XII Simpozijum sa međunarodnim učešćem «Savremene tehnologije i privredni razvoj», Tehnološki fakultet, Leskovac, oktobar 2017. godine održava se pod pokroviteljstvom Ministarstva prosvete, nauke i tehnološkog razvoja Republike Srbije.

12th Symposium with international participation «Novel Technologies and Economic Development», Faculty of Technology, Leskovac, October 2017, was also supported by the Ministry of Education, Science and Technological Development Republic of Srbija.

XII Simpozijum "Savremene tehnologije i privredni razvoj"

Organizator: Tehnološki fakultet, Leskovac

Naučni odbor:

Miodrag Lazić, predsednik, Leskovac, Srbija; Dragiša Savić, Leskovac, Srbija; Vlada Veljković, Leskovac, Srbija; Milorad Cakić, Leskovac, Srbija; Dušan Trajković, Leskovac, Srbija; Suzana Cakić, Leskovac, Srbija; Olivera Stamenković, Leskovac, Srbija; Marija Krasić Stojanović, Leskovac, Srbija; Ivan Mihajlović, Leskovac, Srbija; Pedja Milosavljević, Niš, Srbija; Milena Miljković, Niš, Srbija; Andrija Šmelcerović, Niš, Srbija; Slobodan Petrović, Beograd, Srbija; Sonja Djilas, Novi Sad, Srbija; Jaroslava Budinski Simendić, Novi Sad, Srbija; Darko Goričanec, Maribor, Slovenija; Miloš Sorak, Banja Luka, Bosna i Hercegovina; Radoslav Grujić, Zvornik, Bosna i Hercegovina; Kiril Lisičkov, Skopje, Makedonija; Vineta Srebrenkoska, Štip, Makedonija; Ivan Krakovski, Prag, Republika Češka; Ana Višnjevska, Krakov, Poljska; Nikolao Salomakis, Tesalija, Grčka; Luca Poletto, Padova, Italija; Krasimir Drumev, Gabrovo, Bugarska

Organizacioni odbor:

Ljubiša Nikolić, predsednik, Leskovac, Srbija; Goran Cvetanović, Leskovac, Srbija; Božidar Stojiljković, Leskovac, Srbija; Bojan Jović, Leskovac, Srbija; Igor Denić, Leskovac, Srbija; Goran Jović, Leskovac, Srbija; Sonja Conić, Leskovac, Srbija; Miloš Terzić, Leskovac, Srbija; Milena Marjanović, Leskovac, Srbija; Sreten Stojanović, Leskovac, Srbija; Goran Nikolić, Leskovac, Srbija; Staniša Stojiljković, Leskovac, Srbija; Zoran Kostić, Leskovac, Srbija; Jelena Pejin, Novi Sad, Srbija; Marina Nikolić, Leskovac, Srbija

12th Symposium "Novel Technologies and Economic Development"

Organized by: Faculty of Technology, Leskovac

The Scientific Committee:

Miodrag Lazić, President, Leskovac, Serbia; Dragiša Savić, Leskovac, Serbia; Vlada Veljković, Leskovac, Serbia; Milorad Cakić, Leskovac, Serbia; Dušan Trajković, Leskovac, Serbia; Suzana Cakić, Leskovac, Serbia; Olivera Stamenković, Leskovac, Serbia; Marija Krasić Stojanović, Leskovac, Serbia; Ivan Mihajlović, Leskovac, Serbia; Pedja Milosavljević, Niš, Serbia; Milena Miljković, Niš, Serbia; Andrija Šmelcerović, Niš, Serbia; Slobodan Petrović, Belgrade, Serbia; Sonja Djilas, Novi Sad, Serbia; Jaroslava Budinski Simendić, Novi Sad, Serbia; Darko Goričanec, Maribor, Slovenia; Miloš Sorak, Banja Luka, Bosnia and Herzegovina; Radoslav Grujić, Zvornik, Bosnia and Herzegovina; Kiril Lisičkov, Skopje, Macedonia; Vineta Srebrenkoska, Štip, Macedonia; Ivan Krakovski, Prague, Czech Republic; Ana Višnjevska, Krakow, Poland; Nikolao Salomakis, Tessaaly, Greece; Luca Poletto, Padova, Italy; Krasimir Drumev, Gabrovo, Bulgaria

The Organizing Committee:

Ljubiša Nikolić, President, Leskovac, Serbia; Goran Cvetanović, Leskovac, Serbia; Božidar Stojiljković, Leskovac, Serbia; Bojan Jović, Leskovac, Serbia; Igor Denić, Leskovac, Serbia; Goran Jović, Leskovac, Serbia; Sonja Conić, Leskovac, Serbia; Miloš Terzić, Leskovac, Serbia; Milena Marjanović, Leskovac, Serbia; Sreten Stojanović, Leskovac, Serbia; Goran Nikolić, Leskovac, Serbia; Staniša Stojiljković, Leskovac, Serbia; Zoran Kostić, Leskovac, Serbia; Jelena Pejin, Novi Sad, Serbia; Marina Nikolić, Leskovac, Serbia

SADRŽAJ

SEKCIJA: BIOTEHNOLOGIJA I PREHRAMBENA TEHNOLOGIJA SECTION: BIOTECHNOLOGY AND FOOD TECHNOLOGY	9
Biljana Davidović-Plavšić, Svjetlana Čolić, Nada Vidović, Biljana Kukavica UTICAJ PESTICIDA NA LIPIDNU PEROKSIDACIJU MEMBRANA HUMANIH ERITROCITA	11
Dragan Vujadinović, Radoslav Grujić, Vladimir Tomović, Milan Vukić, Danica Savanović, Vesna Gojković CHANGE IN FUNCTIONAL AND SENSORY PROPERTIES OF ORGANIC SAUSAGES DUE TO THE REPLACE OF PHOSPHATE SALTS WITH NATURAL TEXTURAL MODIFIERS	15
Miloš Gvero, Dino Hasanagić, Ljiljana Topalić-Trivunović, Goran Vučić, Biljana Kukavica UTICAJ RAZLIČITIH KONCENTRACIJA Pb, Mn I Cd NA AKTIVNOST PEROKSIDAZA I KONCENTRACIJU FENOLA U LISTOVIMA <i>Reynoutria japonica</i> Houtt.	25
Marija Menkinoska, Valentina Pavlova, Tatjana Blazhevaska, Natasa Gjorgovska, Viktorija Stamatovska, Vinko Stanoev QUALITATIVE PROPERTIES OF ZINC BIO-FORTIFIED SOFT WHEAT AND FLOUR	34
Ivana Kostić, Darko Anđelković, Tatjana Anđelković, Hristina Kocić, Gordana Kocić, Milica Branković DI(2-ETHYLHEXYL) PHTHALATE EXTRACTION OPTIMIZATION FROM MILK SAMPLES	42
Vesna Gojković, Željka Marjanović-Balaban, Radoslav Grujić, Ljiljana Stanojević, Milorad Cakić DETERMINATION OF THE COMPOSITION OF GLIADINS AND GLUTENINS BY CAPILLARY ELECTROPHORESIS	48
Gjore Nakov, Nastia Ivanova, Stanka Damyanova, Viktorija Stamatovska A REVIEW OF β -GLUCANS (PHYSICAL AND CHEMICAL PROPERTIES, USAGE IN PEOPLE`S DIET AND HEALTH BENEFIT FROM THEIR CONSUMMATION)	56
Viktorija Stamatovska, Gjore Nakov, Tatjana Kalevska, Zora Uzunoska, Aleksandar Saveski CHARACTERISTICS OF BISCUITS WITH ACACIA GUM	64
Ljubinko Barašin, Radoslav Grujić, Goran Vučić, Meho Bašić UTICAJ RAZLIČITIH USLOVA OMAMLJIVANJA PILIĆA NA KVALITET PILEĆEG MESA	74
Goran Vučić, Ana Velemir, Ladislav Vasilišin KVALITET KOMPOTA OD BRESKVE RAZLIČITIH PROIZVOĐAČA NA TRŽIŠTU GRADA BANJA LUKA	84

SEKCIJA: ORGANSKE HEMIJSKE TEHNOLOGIJE I POLIMERNO INŽENJERSTVO	
SECTION: ORGANIC CHEMICAL TECHNOLOGY AND POLYMER ENGINEERING	93
Vojkan Miljković, Marija Tasić-Kostov, Nebojša Cekić, Milorad Cakić, Goran Nikolić	
FITOPREPARAT NA BAZI METANOLNOG EKSTRAKTA PLODA BELOG I CRNOG DUDA (<i>Morus alba</i> L., <i>Morus nigra</i> L.) ZA DERMATOLOŠKU PRIMENU	95
SEKCIJA: HEMIJSKO I EKOLOŠKO INŽENJERSTVO	
SECTION: CHEMICAL AND ENVIRONMENTAL ENGINEERING	103
Vladimir Pavićević, Svetomir Milojević, Marko Radović, Miljana Marković, Mihailo Ristić[†], Milan Milivojević	
UTICAJ NAČINA ZAGREVANJA KOD HIDRODESTILACIJE PLODA KLEKE NA HEMIJSKI SASTAV ETARSKOG ULJA	105
Nebojša Knežević, Ljiljana Vukić, Danijela Knežević	
UTICAJ PROCJEDNIH VODA SA DEPONIJE RAMIĆI KOD BANJA LUKE NA VODOPRIJEMNIK – POTOK GLOGOVAC	113
Darko Anđelković, Milica Branković, Bojan Zlatković, Tatjana Anđelković, Ivana Kostić	
<i>PISTIA STRATIOTES</i> POTENTIAL FOR THE REMOVAL OF ZINC(II) ION FROM WATER	123
SEKCIJA: TEKSTILNE TEHNOLOGIJE	
SECTION: TEXTILE TECHNOLOGY	129
Dragana Grujić, Aleksandar Savić, Ljiljana Topalić-Trivunović, Ana Velemir, Mladen Stančić, Branko Neral	
UTICAJ ANTIMIKROBNE ŠTAMPE EKSTRAKTIMA LJEKOVITIH BILJAKA NA TOPLOTNA SVOJSTVA PLETENINA	131
Silvana Zhezhova, Aco Janevski, Sonja Jordeva, Darko Andronikov, Kiro Mojsov	
APPAREL INDUSTRY IN MACEDONIA, CONDITIONS AND CHALLENGES	141
Sashka Golomeova, Goran Demboski	
INVESTIGATION OF SEAM PERFORMANCE USING TWO DIFFERENT METHODS	148
Petar Stojanović, Dušan Trajković, Nataša Radmanovac, Jovana Stepanović	
DEFINISANJE GRANIČNIH OPTEREĆENJA TEKSTURIRANIH PES FILAMENTNIH PREĐA	155
Miloš Sorak, Dragić Miroslav, Snežana Urošević, Boris Valjevac	
RAZVOJ METODOLOGIJE PROJEKTOVANJA I IMPLEMENTACIJE SISTEMA MENADŽMENTA KVALITETOM PREMA ZAHTJEVIMA STANDARDA ISO 9001:2015	163

R. Petrović, Z. Petrović, P. Dugić, J. Penavin-Škundrić, D. Bodroža UKLANJANJE TEKSTILNE BOJE IZ VODENOG RASTVORA UPOTREBOM BENTONITA	172
SEKCIJA: SOCIJALNO-EKONOMSKE IMPLIKACIJE INOVACIJA I NOVIH TEHNOLOGIJA SECTION: SOCIAL AND ECONOMIC IMPLICATION OF INNOVATIONS AND NOVEL TECHNOLOGIES	181
Ognjen Dimitrijević SOCIO-EKONOMSKE IMPLIKACIJE BITKOINA	183
Tatjana Đekić, Saša Đekić NEGATIVNE IMPLIKACIJE RAZVOJA TEHNOLOGIJA U TURIZMU NA ŽIVOTNU SREDINU	195
Tatjana Đekić, Saša Đekić IMPLIKACIJE NOVIH TEHNOLOGIJA U DISTRIBUCIJI HRANE I UVOĐENJE NOVIH KOMERCIJALNIH TEHNOLOGIJA	203
Slavica Popović, Mira Avramović PRIMENA SAVREMENE INFORMACIONO-KOMUNIKACIONE TEHNOLOGIJE U RAZVIJANJU STRATEGIJE UPRAVLJANJA ODNOSIMA SA KLIJENTIMA USLUŽNIH ORGANIZACIJA	215
Jelena Krtstić Randić, Ivana Zdravković, Dragana Randelović, Milan Ljušić TEHNOLOŠKI PROGRES KAO USLOV RASTA I RAZVOJA PRIVREDNIH SUBJEKATA	225
Jasmina Jović, Predrag Radovanović NEW TECHNOLOGIES AND BUSINESS EFFICIENCY OF TRAVEL AGENCIES IN SRBIJA	232
Predrag Radovanović, Nenad Radovanović NEW TECHNOLOGIES IN FINANCE: CRYPTOCURRENCIES – A CASE O BITCOIN	243
Mira Avramović, Slavica Popović ON-LINE MARKETING ISTRAŽIVANJE U SEKTORU USLUGA U FUNKCIJI RAZUMEVANJA PONAŠANJA POTROŠAČA	253
Anton Vorina, Miro Simonić, Denis Tomše THE RELATIONSHIP BETWEEN THE INVESTMENT IN NEW TECHNOLOGIES AND THE EMPLOYEE`S SATISFACTION	261
Jože Kranjc, Bojan Sešel CONCERNING BIASES ABOUT SOCIO-ECONOMIC IMPLICATIONS OF ARTIFICIAL INTELLIGENCE	269

INVESTIGATION OF SEAM PERFORMANCE USING TWO DIFFERENT METHODS

Sashka Golomeova¹, Goran Demboski²

¹Faculty of Technology, University "Goce Delcev" - Stip, Macedonia

²Faculty of Technology and Metallurgy, University "Ss.Cyril and Methodius" - Skopje, Macedonia

In this paper seam performance of lightweight fabrics was investigated using two methods: ISO 13936-3 and ISO 13935-2:2004 + ISO 13936-1:2004. The aim of the paper is to compare whether the same assessment of the seam performance will be obtained using these two methods. In this study three lightweight woven fabrics for ladies clothes were investigated. The obtained results have shown that, both methods used, give a matching evaluation of the fabrics properties with reference to the seam slippage. The both methods also give matched assessment of the seam strength performance, while the seam strength measured according to the method ISO 13935-2:2004 + ISO 13936-1:2004 is somewhat lower in comparison to the seam strength of the needle clamp method (ISO 13936-3), due to the elimination of sewing thread in the second method.

Key words: seam, seam slippage, seam strength, needle clamp

INTRODUCTION

Seam slippage and seam strength are the seam quality criteria which define a seam stability. Therefore, achieving satisfactory seam strength and seam slippage resistance is of great importance for overall seams quality in garment product development [1-3]. In everyday use, garments are normally subjected to loads less than those required for rupturing the seam but which may be sufficient to slip one yarn system over the other in the fabric [4,5]. As a result of yarn slippage an opening appears near the seam [6]. This phenomenon occurs before seam rupturing which can be a result of fabric breaks, thread breaks or both. Seam strength refers to the load required to break a seam. There are various factors that can affect seam strength. Many previous studies [7, 8] showed that seam strength depend on the interrelationship of fabrics, threads, stitch and seam selection, and sewing conditions, which include: needle size, stitch density, appropriate operation, sewing machine setup etc. [9-11]. Many researchers have investigated seam slippage in order to determine the causes of this phenomenon and to find techniques to reduce or eliminate it. The obtained results show that, higher weft density; cover factor, yarn count of fabric yarns and lower weave factor lead to seam slippage decreasing [12-14]. Seam slippage may also be affected by stitch type, stitch density, width of seam allowance, fabric's sewing direction, seam type and size, type of sewing thread and thread tension.

There are a lot of standard methods which investigate the seam slippage and seam strength, so the aim of this work is to compare two ISO standard methods and to determine whether the same assessment of the seam performance will be obtained.

EXPERIMENTAL PART

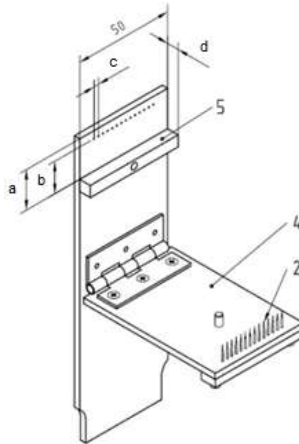
Seam performance of three lightweight fabrics was investigated using two methods. The characteristics of fabrics used are given in Table 1. The surface density was measured according to the standard MKS BS EN 12127:1998, yarn count according to the standard ISO 7211-5:1984 and MKS EN 1049-2:2007 was used to determine yarn density.

Table 1. Characteristics of fabrics used in tests

Fabric	Composition	Weave	Yarn count (tex)		Yarn density (cm ⁻¹)		Cover factor	Surface density (g·m ⁻²)
			Warp	Weft	Warp	Weft		
			F1	silk	plain	3.2		
F2	PES	plain	7.2	7.2	35	29	0.54	47
F3	cotton	plain	14	14	54	26	0.82	114

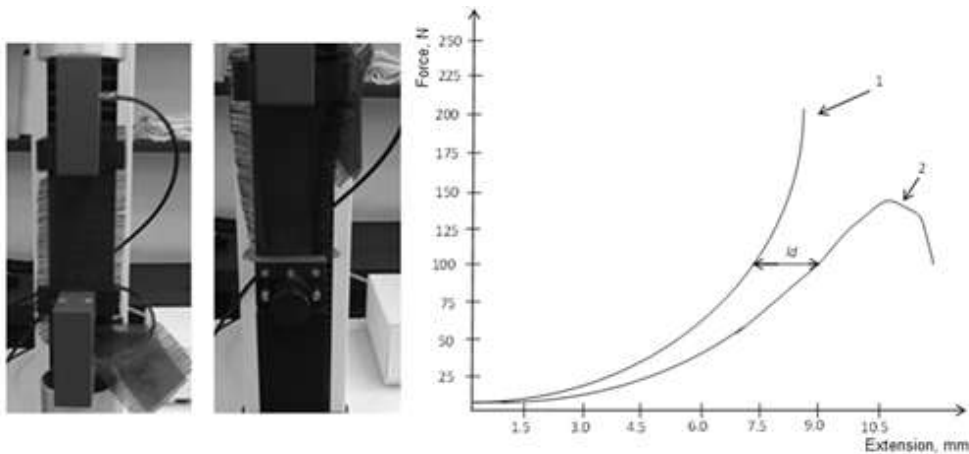
The first method used in this investigation was the needle clamp method ISO 13936-3, and the second method ISO 13935-2:2004 + ISO 13936-1:2004 where test procedure involves extension of two samples, one without seam and one with seam.

According to the standard ISO 13936-3, the seam is simulated by using a needle clamp (Figure 1). A pinned and unpinned test samples are separately extended by using tensile testing machine fitted with a needle clamping device for the pinned sample and conventional jaws for the unpinned sample, which produced two force/extension curves originating from the same abscissa. The horizontal distance between force/extension curves is seam opening as the result of seam slippage (Figure 2). According to this standard method yarn slippage near the seam in millimeters is measured, at fixed load of 100 N and 200 N.



Legend: 2- needles; 4- hinged jaw; 5- stop; a- distance from stop to top edge of pin device (mm); b- distance from stop to centre of pin line (mm); c- distance between axes of adjacent needles (mm); d- diameter of needle bias (mm)

Figure 1. Diagram of a needle clamp



Legend: 1- tensile strength using conventional clamps curve, 2- tensile strength using the needle clamp curve

Figure 2. Seam performance investigation according to the method ISO 13936-3

The test procedure of the method ISO 13936-1:2004 + ISO 13935-2:2004 involves extension of two samples, one without seam and one with seam, and the results are two force/extension curves, Figure 3. The horizontal distance between force/extension curves is seam opening as the result of seam slippage. The ISO 13936-1 standard

measures seam slippage strength for fixed seam opening from 2 - 6 mm. The measurement of seam slippage strength for 3 mm seam opening was chosen as more rigorous criteria for high quality garment. If seam slippage strength is higher than 200 N, then the result is reported as “no seam slippage”.

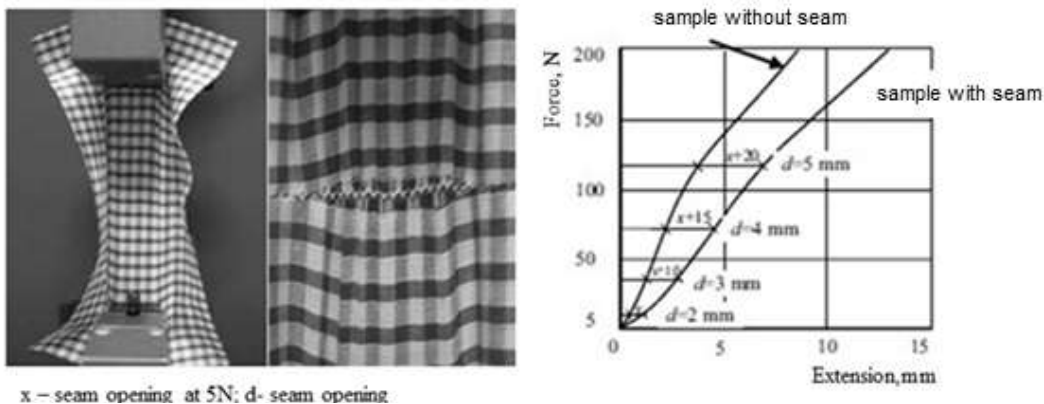


Figure 3. Force/Extension curves for sample without seam and sample with seam

The seam samples were sewn using the sewing parameters given in Table 2. Samples were sewn with 301 type of stitch, in warp direction with a high speed sewing machine Juki DDL 9000B using polyester core-spun sewing threads. All measurements were made with the tensile testing machine “Tinious Olsen” H5KT.

Table 2. Sewing parameters

Fabric	Thread count (tex)	Needle size	Stitch density (dm ⁻¹)
F1	18	60	50
F2	21	65	50
F3	30	75	50

RESULTS AND DISCUSSION

The results from the needle clamp method ISO 13936-3 in Table 3 are given. The results are average values of five measurements.

Table 3. Seam performance investigated according to the method ISO 13936-3

Fabric	Tensile strength (N)	Seam opening (mm)	Seam strength (N)
F1	100	/	77.7
	200	/	
F2	100	3.7	>200
	200	5.1	
F3	100	1.8	187.5
	200	/	

From the results given for force 100 N, it can be concluded that the fabrics F2 and F3 are more prone to seam slippage, while for the fabric F1, this method does not report any slippage, because seam breaking at 77.7 N occurs. The composition of the fabric F1 is silk and this fabric has very low surface density, so these are the reasons for seam breaking at lower force. At 100 N tensile strength, the seam opening in the fabric F2 is 3.7 mm, and in the fabric F3 it is 1.8 mm. At 200 N tensile strength, in the fabric F2 5.1 mm seam opening appears, and for the fabric F3 we don't have data for seam slippage because seam breaks at force 187.5 N. The fabric F2, fiber composition is polyester and has a lower cover factor, which is the reason for higher seam opening compared to the cotton fabric F3. The needle clamp method eliminates the impact of sewing thread as a factor and the effect of the fabric structure on seam slippage can be more investigated.

Table 4. Seam performance investigated according to the method ISO 13936-1

Fabric	Seam slippage strength (N)	Seam strength (N)	Cause of seam breaking
F1	24.5	60.3	Fabric breaks
F2	13.3	20.9	Thread breaks
F3	80.6	163.2	Fabric breaks

The results from the second method ISO 13936-1:2004 + ISO 13935-2:2004 are given in Table 4. The phenomenon of seam slippage before seam breaking occurs in all three fabrics. During the action of tensile force perpendicular to the seam, a seam deformation occurs which consists of stitch deformation and fabric deformation. Seam slippage is the result of fabric deformation. The lowest seam slippage resistance has the fabric F2. Two applied methods confirm that, seam slippage resistance of the fabric F2 is lower than the fabric F3. The obtained results have shown that, both methods have matching evaluation of the fabrics properties with reference to the seam slippage. The comparison of the results shows that, according to the method ISO 13936-1:2004 + ISO 13935-2:2004, the seam opening as a result of seam slippage, appears at lower force compared to the needle clamp method (ISO 13936-3). The fabric F2 shows 3.7 mm seam opening at 100 N tensile strength (needle clamp method), while according the other method with sewn seam, 3 mm seam opening appears at 13.3 N. The same is noted for fabric F3: at 100 N tensile strength the seam opening of 1.8 mm appears (needle clamp method), and according to the method ISO 13936-1:2004 + ISO 13935-2:2004, the seam opening of 3 mm appears at 80.6 N.

The situation is the same for seam strength. The seam strength measured according to the method ISO 13935-2:2004 + ISO 13936-1:2004 is lower in comparison to the seam strength of the needle clamp method (ISO 13936-3). For example, seam strength measured according to the needle clamp method for the fabric F1 is 77.7 N, and seam strength for the same fabric measured according to the method ISO 13935-2:2004 + ISO 13936-1:2004 is 60.3 N. For fabric F3, seam strength measured according to the needle clamp method is 187.5 N, and seam strength measured according to the method with sewn seam ISO 13935-2:2004 + ISO 13936-1:2004 is 163.2 N. The both methods give matched assessments; the fabric F3 has higher seam strength than the fabric F1. The fabric F2 has high seam strength (>200 N) according to the needle

clamp method, but seam strength obtained according to the method ISO 13935-2:2004 + ISO 13936-1:2004 is very low, 20.9 N, due to sewing thread breaking. Higher seam strength and lower seam slippage obtained according to the needle clamp method ISO 13936-3 in comparison with the method with sewn seam ISO 13935-2:2004 + ISO 13936-1:2004, is due to different seam breaking mechanism. The method ISO 13936-3 doesn't involve thread in seam performance investigation and the possibility of fabric damage during sewing is eliminated. Because seam breaking can occur as a result of thread breaking, fabric breaking or both, it was expected that seam strength measured according to ISO 13935-2:2004 + ISO 13936-1:2004 will be lower. This is due to mechanical strain to which the fabric is exposed during sewing, the friction between the fabric and the sewing thread, and the possible damage of the fabric from the impact of the needle penetrating the fabric.

CONCLUSION

In this study seam performance of three lightweight fabrics was investigated using two methods: ISO 13936-3 and ISO 13935-2:2004 + ISO 13936-1:2004. From the results obtained we can conclude that, both methods used have comparable evaluation of the fabrics properties with reference to the seam slippage. The method ISO 13936-3 may be more restricted for investigation of seam performance of very lightweight fabrics, because breaking of the simulated seam can occur at force lower than 100N. The results from investigation of the seam strength have shown that both methods give matched assessments of the seam strength performance. The comparison of the results shows that, according to the method ISO 13935-2:2004 + ISO 13936-1:2004, the results for seam strength are lower and for the seam slippage are higher in comparison to the seam strength and seam slippage of the needle clamp method ISO 13936-3.

LITERATURE

- [1] R. Namiranian, S.S. Najar, M.S. Eteati and M.A. Manich, *Indian Journal of Fiber & Textile Research* 39 (2014) 221.
- [2] F.F.S. Ebrahim, *Journal of American Science* 8 (2012) 429.
- [3] B. Murugesan, *Journal of Scientific & Industrial Research* 73 (2014) 521.
- [4] S.J. Kadohph, A.L. Langfoid, N. Hollen and J. Saddler, *Textiles*, MacMillan, New York 1993 p. 552.
- [5] A.M. Seif, *International Journal of Textile and Fashion Technology* 4 (2014) 1.
- [6] ISO 13936-1:2004, International standard organization 2004.
- [7] A. Gurarda and B. Meric, *Textile ve Konfeksiyon* 20 (2010) 65.
- [8] F. Kalaoglu, *International Journal of Cloth Science Technology* 17 (2005) 171.
- [9] N. Jebali, B.A. Dhoub and B.M. Hassen, International conference of applied research in textile, CIRAT- 5 (2013) 1.
- [10] J. P. Domingues, A. M. Manich, R. M. Sauri and A. Barella, *International Journal of Clothing Science and Technology* 9 (1997) 75.
- [11] J. Kozeniauskiene and V. Daukantiene, *Materials Science* 19 (2013) 78.
- [12] B.K. Behera, S. Chand, T.G. Singh and P. Rathee, *International Journal of Clothing Science and Technology* 9 (1997) 128.
- [13] N. Tarafdar, R. Karmakar and M. Mondol, *Man-Made Textiles in India* 50 (2007) 298.

[14] S. Gribaa, S.B. Amar and A. Dogui, International Journal of Clothing Science and Technology 18 (2006) 235.

IZVOD

ISPITIVANJE KARAKTERISTIKA ŠAVOVA PRIMENOM DVA RAZLIČITA METODA

Sashka Golomeova¹, Goran Demboski²

¹Tehnološki fakultet, Univerzitet "Goce Delčev", Stip, Makedonija

²Tehnološko-metalurški fakultet, Univerzitet "Sveti Kiril i Metodije", Skopje, Makedonija

U radu se ispituju performanse šavova kod lakih tkanina korišćenjem dve metode: ISO 13936-3 i ISO 13935-2:2004 + ISO 13936-1:2004. Cilj rada je da se uporedi da li će dve različite metode dati istu procenu osobina šava. Ispitane su tri lake tkanine namenjene su proizvodnju ženske odeće. Dobijeni rezultati su pokazali da obe metode, daju usaglašene procene svojstava tkanina u smislu klizanja šava. Poređenje rezultata pokazuje da kod obe metode postoji preklapanje ocena za performanse jačine šava, ali jačina šava izmerena prema postupku ISO 13935-2:2004 + ISO 13936-1:2004 je nešto niža u odnosu na jačinu šava kod metode ISO 13936-3, kao rezultat eliminacije faktora šivaćeg konca u drugom postupku.

Ključne reči: šav, klizanje šava, jačina šava, stezaljka sa iglama