

Comparative Performance Evaluation on Different Brands of Knitting Lubricant

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Abstract: Knitting lubricant plays an essential role in production and maintenance during knit fabric manufacturing process. As a consequence, lubricant spot related quality concerns also occur very frequently. Different brands of knitting lubricant, having different attributes are available in the market and this paper aims to present a comparative analysis on three different types of knitting lubricant brands commonly used in the knitwear factories of Bangladesh. The study presents the findings of wash ability test and other performance indicators for each brand and suggests better lubricant accordingly.

Keywords: Knit Fabric, Knitting Lubricant, Performance, Wash ability, Quality.

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I. Introduction

Knitting lubricant is an important ingredient of a knitting industry which can have significant effects on fabric quality during knit fabric manufacturing. Knitting lubricant needs to have good wash ability and good physical and chemical properties to be compatible with machines and fabrics. For knitted fabric, lubricant mark or lubricant spot related problems are a common issue. These problems may vary from lubricant brand to brand depending on their properties and performance.

From raw cotton processing to finished textile, it's a long journey that depends on reliability and performance of different machines. Whether in cotton and synthetic yarn production, fabric knitting and weaving or in textile finishing, machine elements are constantly subject to high loads and have to operate efficiently. High speeds, wide temperature ranges and chemical influences are factors that impede an optimum effect on machine elements on regular basis [1]. In the textile industry, the lubrication requirements vary from machine to machine and from process to process. The loads, speeds and vibrations to which bearings, chains and gear wheels are exposed can be very high. In many cases, machine manufacturers specify different lubricants to be used for the individual friction point. This results in a huge logistical effort for the production sites around the world and entails the risk of errors in case lubricants are mixed up [2].

Scholarly contribution on practical performance evaluation of the common knitting lubricants is very limited. However, this paper intends to explore wash ability and other functional properties which are related to the effect of lubricant on fabric quality and shows a comparative analysis among the lubricants of different brands.

II. Materials and Methods

Materials:

Sample Fabric: 95% cotton and 5 % lycra, single jersey fabric of 190 GSM

Sample Knitting lubricant:

Kluber: Kluber lubrication is one of the world's leading manufacturers of specialist lubricants German brand, offering high-end tri biological solutions to virtually all industries and markets worldwide. Most products are developed and made to specific customer requirements. During its more than 80 years of existence, Kluber Lubrication has provided high-quality lubricants, thorough consultation and extensive services, which has earned it an excellent reputation in the market [2].

Lubcon: Lubricant Consult GmbH is a worldwide operating lubricant manufacturer developing, producing and distributing high-performance lubricants, greases, pastes and sprays for all industrial applications. The German company with the trademark "LUBCON" was founded in 1980 and has established an extensive network of subsidiaries, sales representatives and lubrication experts in over 50 countries around the world [1].

TCC: Taiwan Chemical Company is a company specialized in producing the high quality of textile lubricant with the mineral lubricant and synthetic lubricant. With its numerous achievements and the leadership role in the lubricant industry, the company is widely recognized for its quality in all industrial sites [3].

Table 1: Properties of collected knitting lubricant samples of three brands

Sample No	Lubricant Brand Name	Origin	Chemical Name	Lubricant type	Appearance	Temperature Range °C	Viscosity At 40°C
1	Kluber	Germany	Kluber Silvertex HS 68	Fully synthetic	Transparent	-18°C up to +220 °C	22-65 mm ² /s
2	China Tianchen Engineering Corporation (TCC)	China	NEO AS-900	Fully synthetic	Transparent	-18°C up to +200 °C	20-32 mm ² /s
3	Lubcon	Germany	TURMOTE XLUBRIC ANT LP 22 W	Fully synthetic	Transparent	-30°C up to +180 °C	22-45 mm ² /s



Figure 1: Knitting lubricant sample

Testing Method and Equipments:

Table 2: Testing method and equipments used for tests

Tests	Methods	Equipment's
Fabric weight	Manually	Scissor, Electric balance
Wash ability test by normal water	Manually	N/A
Wash ability test after scouring	Manually	Pipet, Electric balance, Graduated cylinder, Conical flask, Steel pot, Sample dyeing machine
Absorbency test after scouring	AATCC/ASTM Test Method TS-018	Pipet

Standard testing methods and preparatory procedures were properly followed for each test.

III. Procedure Methodology:

Three different types of lubricant samples were collected from three different factories: Kluber from Fakir Apparels Limited (Fatullah, Narayangonj), TCC from Abanti Color Tex Limited (Fatullah, Narayangonj), Lubcon from Mondol Knitweaves Limited (Kashimpur, Gazipur).

Two single jersey knit grey fabric samples (A & B) of same specification: 95% cotton, 5% lycra, 190 GSM were collected. Sample A was divided into three parts (A1, A2, A3) to continue Normal water test and sample B into 3 parts (B1, B2, B3) to run scouring and absorbency test. All the necessary parameters of knitting lubricant and knit fabric samples were collected from production floor of knitting units. Experimental results were then studied, evaluation from respective factories was taken and comparative results were disclosed.

IV. Results & Discussion:

A. Wash Ability Test by Normal Water:

Table 3: Wash ability test by using normal water

Sample A	Lubricant Brand Name	Washing Time Duration	Wash ability Performance Rating out of Scale 5	Comments
A1	Kluber	5 minutes	3	Still have some lubricant mark
A2	Tcc	5 minutes	4	Less lubricant mark after wash
A3	Lubcon	5 minutes	2	Still have so many lubricant mark

Comment: TCC (NEO AS-900) knitting lubricant has better wash ability in normal water.

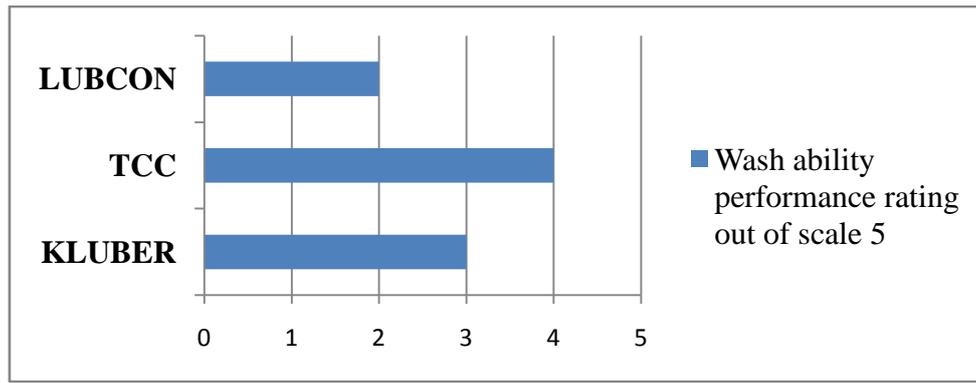


Chart 1: Normal water wash ability test chart

B. Wash Ability Test after Scouring:

Table 4: Wash ability test by scouring

Sample No B	Lubricant Brand Name	Wash ability performance Rating out of Scale 5	Comments
B1	Kluber	4	Less lubricant mark
B2	Tcc	3	Less lubricant mark
B3	Lubcon	2	So many lubricant mark

Comment: Kluber (Kluber Silvertex HS 68) lubricant has better wash ability after scouring.

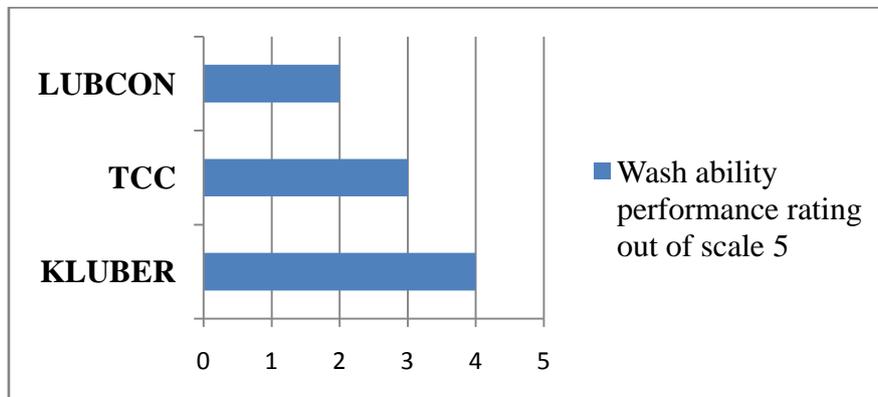


Chart 2: Chart of Wash ability test by scouring



Figure 2: Sample after normal water wash ability test



Figure 3: Specimen after scouring

C. Absorbency test after scouring:

Table 5: Absorbency test comparison

Sample No B	Lubricant Brand Name	Absorbency Rating out of Scale 5	Absorbency Performance rating
B1	Kluber	5	Excellent
B2	Tcc	4	Good
B3	Lubcon	2	Poor

Comment: Kluber (Kluber Silvertex HS 68) has better water absorbency.

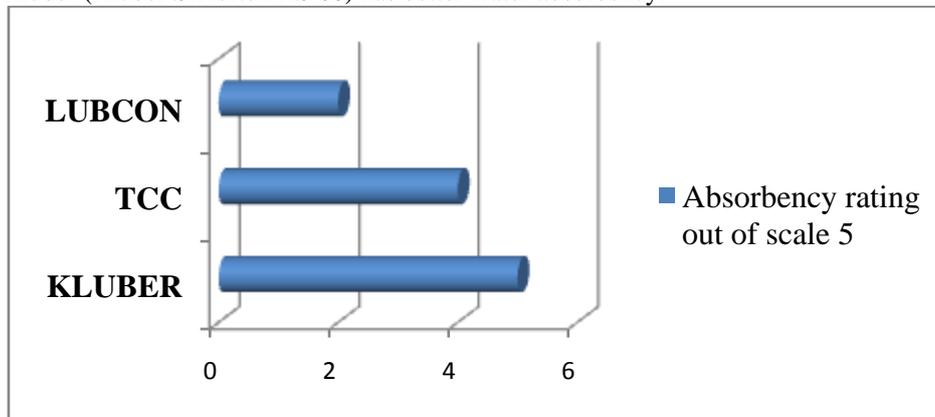


Chart 3: Absorbency test chart

Table 6: Lubricant performance rating according to factory

Sample no	Lubricant Brand Name	Machine performance	Lubricant Utility	Normal water wash ability test rating out of scale 5	Wash ability rating after scouring out of scale 5	Water absorbency Rating out of scale 5	Lubricant price/litter (BDT)	Factory looking for use another brand lubricant
1	Kluber	Excellent	Excellent	3	4	5	370	No
2	Tcc	Good	Good	4	3	4	280	No
3	Lubcon	Good	Poor	2	2	2	368	Yes

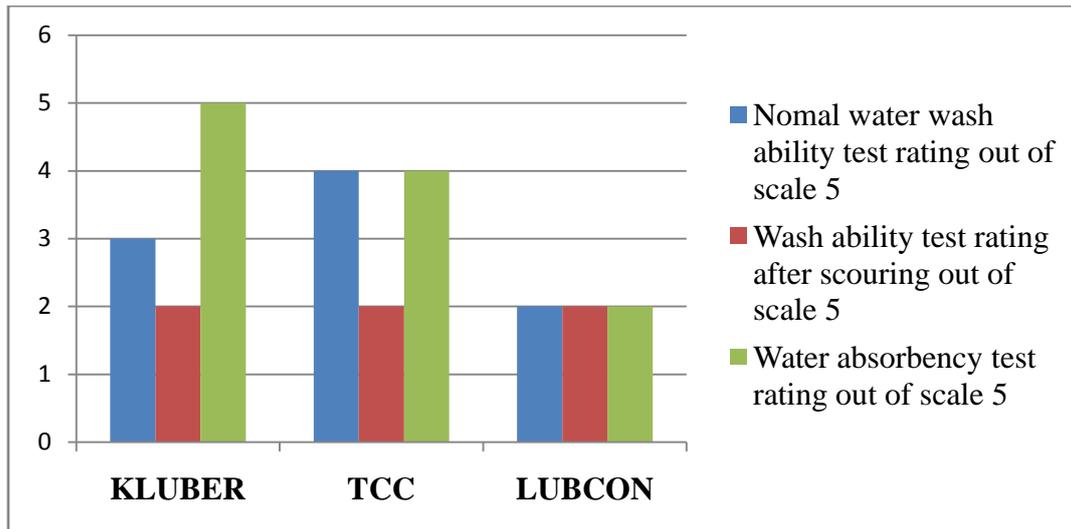


Chart 4: Lubricant performance rating chart

V. Conclusion:

Lubricant mark is a day to day problem in knit production, thus choosing a better lubricant brand worth attention. To remove critical lubricant marks more chemical, extra time, more temperature are required which results in extra cost of time and money. Kluber, Lubcon, TCC all are very popular knitting lubricant brand in Bangladesh. In our test results, Lubcon showed poor performance compared to other two. TCC - NEO AS-900 GH showed better result in normal water wash. On the other hand, Kluber is found better in test after scouring and also has better absorbency. Factory perception on the lubricant brands also matches our results. Kluber has not only higher viscosity, but also better compatibility with machines and fabrics. Though price is bit higher, kluber is found to be the best performing lubricant in our analysis.

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