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A Study On The Effect Of Fabric Weight On Tearing Strength, Pilling Resistance And Drapability Of Panne Velvet Fabric

[1]AFSANA S, [2]Mrs. MAHMUDA BEGUM M

[1]Assistant Professor, Department of Fashion Design, Dr. M.G.R. Educational and Research Institute, Chennai - 95.

[2]Associate Professor, Head of the department, Department of Fashion Design, Dr. M.G.R. Educational and Research Institute, Chennai - 95.

ABSTRACT

This study investigates the performance of the GSM, resistance to tearing, resistance to surface fiber aggregation, and fabric drape coefficient of the Panne Velvet fabric. These investigations were assessed by laboratory tests. The GSM of the fabric was determined by using the "Digital Weight Balance." The resistance to tearing is evaluated as per the ASTM D412 standard test method. The resistance to surface fiber aggregation was facilitated by the "Autopill 2BX Tester," and the fabric drape coefficient was measured by using "The Eureka Drape Meter." The results from the instrument measurements demonstrate the suitability of Panne velvet fabric for various textile applications, highlighting its structural characteristics, mechanical performance, and user-friendly properties.

Key words : GSM, Resistance to Tearing, Resistance to Surface fibre aggregation, Fabric drape coefficient.

INTRODUCTION

The Panne Velvet is a crushed velvet with a mechanical stretch. It is widely used for making apparel, accessories, wedding gowns, shoes, etc. Panne Velvet trade has been made global, as it is emerging and growing as a fashion product. It has been used for functional, aesthetic, and decorative purposes. The term derives from the Middle French "shaggy." It has been a fixture of fashion design and home decor for years, and it has a high-end feel. Velvet is also a fixture of home decor, where it's used as upholstery fabric, curtains, pillows, and more. Knitted panne velvet is a variation of this fabric that is created using a knitted construction method.

THE OBJECTIVES OF THE STUDY ARE :

- To assess the weight of the panne velvet fabric.
- To evaluate the tearing strength of the panne velvet fabric.
- To identify the pilling resistance of the panne velvet fabric.
- To analyse the drapability of the panne velvet fabric.

EXPERIMENTAL PROCEDURE

The main objective of this study is to determine the GSM, resistance to tearing, resistance to surface fibre aggregation, and fabric drape coefficient of the Panne Velvet fabric. The results were derived from laboratory testing performed on the selected velvet fabric.

FABRIC WEIGHT

The sample was prepared by cutting the fabric into 10 centimetre x 10 centimetre square fabric. Five samples from each of the fabrics were taken and weighed in a "Digital Weight Balance". The mean of the reading was taken and expressed as grams per square metre. The average of five readings was taken.

TEARING STRENGTH

According to the ASTM D412 standard test method, tear strength as well as tensile and elongation properties are measured. A specimen of 100 mm x 63 mm was taken and was placed in the upper and lower jaws of the tensile tester, and a chart was recorded as the fabric was torn. The tearing strength of the fabric is expressed in kN (kilonewtons) and/or kg (kilograms). The readings were directly recorded from the dial and expressed in kN and kg.

PILLING RESISTANCE

An "Autopill 2BX Tester" was used to conduct the test, simulating the rubbing motion that takes place during everyday use. The specimen is mounted on a polyurethane tube, placed in a cork-lined wooden box and tumbled; the pilling performance is evaluated by visual description. The testing device was used to rub the fabric sample against an abrasive surface for a predetermined number of cycles, usually 100 or 200. The pilling resistance rates are Class 5 – No pilling, Class 4 – Slight pilling, Class 3 – Moderate pilling, Class 2 – Severe pilling and Class 1 – Very severe pilling.

DRAPABILITY

"The Eureka Drape Meter" was used to analyse the drape coefficient of selected samples, and the results were given. The percentage of the drape coefficient was calculated according to the formula F = Ws-Wd / WD-Wd, where Ws is the weight of the paper traced along the modes of the shadow, WD is the weight of the paper along the outer disc, Wd is the weight of the paper traced along with the smaller disc, and F is the drape coefficient expressed in percentage.

RESULTS AND DISCUSSION

FABRIC WEIGHT

The weight of the fabric is expressed in g/sq.m. Five different samples were taken from the same fabric, and the Weight of the fabric varied from 119.6 to 119.8 Grams Per Square Meter (GSM). The average value of each sample was taken and it was noted as 119.7 GSM.

FABRIC WEIGHT (g/sq.m)

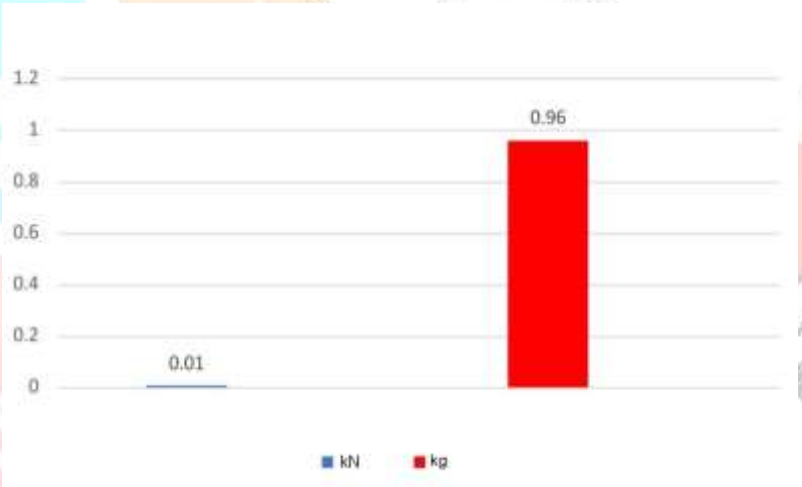
S.No	Sample (Panne Velvet fabric)	Readings	Mean (g/sq.m)
1	A	119.6	**119.7 GSM**
2	B	119.7	
3	C	119.8	
4	D	119.8	
5	E	119.7	

TEARING STRENGTH

The tearing strength is expressed in kN/m (kilonewtons) and was determined by using the Elmendorf tearing tester. Five different samples were taken from the same fabric, and the tearing strength of the fabric varied from 0.95 to 0.98 kilograms (kg), whereas the kilonewtons remained the same at 0.01 KN. The average value of each sample was taken, and the tearing strength of the fabric is 0.01 KN.

TEARING STRENGTH (kN and kg)

S.No	Samples (Panne Velvet fabric)	Tearing Strength (kN)	Tearing Strength (kg)	Mean value (kN)	Mean value (kg)
1	A	0.01	0.95	**0.01kN**	**0.96kg**
2	B	0.01	0.95		
3	C	0.01	0.96		
4	D	0.01	0.96		
5	E	0.01	0.98		

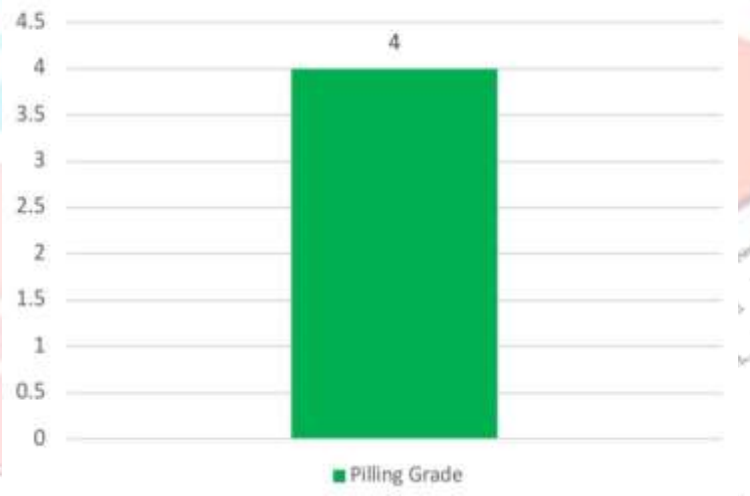


PILLING RESISTANCE

The pilling resistance of the fabric is reported on an arbitrary scale ranging from 5 (no pilling) to 1 (very severe pilling).Five samples were taken from the same fabric to identify the number of pillings, and the pilling resistance of the fabric varied from 3 to 4. The average value of each sample was taken, and it was noted as Class - 4.

PILLING RESISTANCE (Class)

S.No	Sample (Panne Velvet fabric)	Pilling Grade	Pilling Grade (Mean value)	Surface pilling
1	A	4	**Class - 4**	**Light**
2	B	3		
3	C	4		
4	D	4		
5	E	4		

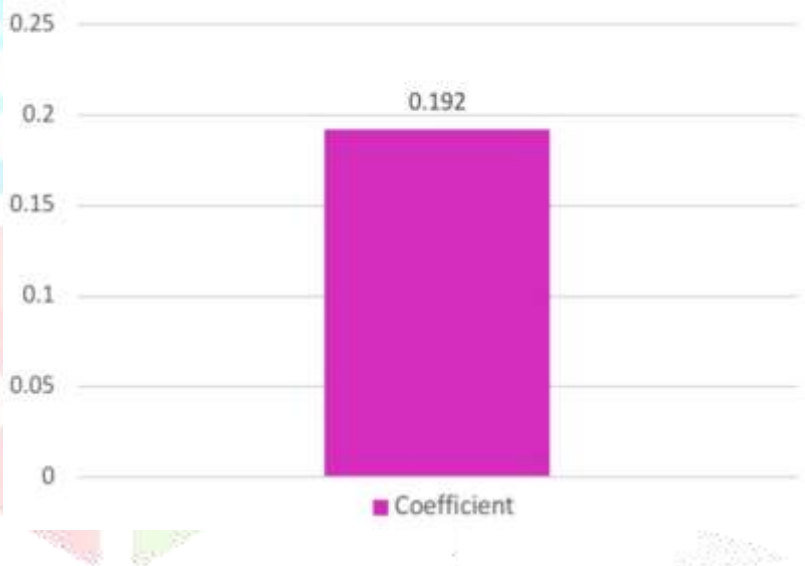


DRAPABILITY

The drape of the Panne Velvet Fabric specimens was measured. Lower drape coefficient indicates better drape. Five different samples were taken from the same fabric , and the Drapability of the fabric varied from 0.191 to 0.194% . The average value of each sample was taken and the results showed that the Panne Velvet Fabric had less drape coefficient of 0.192 and it was Highly Drapable.

DRAPABILITY (%)

S.No	Sample (Panne Velvet fabric)	Co-efficient (%)	Drapability
1	A	0.192	**0.192% Highly Drapable**
2	B	0.193	
3	C	0.191	
4	D	0.193	
5	E	0.194	



SUMMARY

The experimental results have been compiled and presented below:

- The fabric weight of the panne velvet results in 119.7 GSM; hence, it is a lightweight fabric.
- With regard to tearing strength, the Panne Velvet fabric showed 0.01 kN and 0.96 kg, which results in excellent tearing strength.
- The fabric holds subtle fibre fuzziness with slight pills on the surface of quality level 4.
- The selected fabrics showed 0.192% of draping coefficient; hence, they exhibited high drapability.

CONCLUSION

This study is to evaluate the GSM, resistance to tearing, resistance to surface fibre aggregation, and fabric drape coefficient of the panne velvet fabric.The results state that the fabric is light in weight, which makes the fabric easy to flow.The tear strength of the fabric denotes high performance, ensuring durability under stress. The observation denotes subtle fibre fuzz with occasional pills on the surface of the quality level 4 evaluation result, maintaining a smooth surface and long-lasting appearance. The fabric exhibits excellent flowing property, making it ideal for flowing garments, and it is suitable for high-end fashion applications.

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