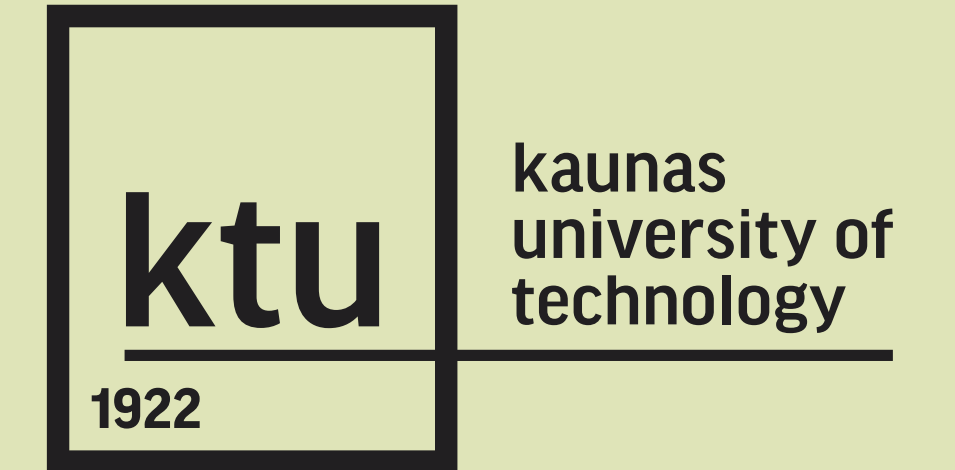


INVESTIGATION ON INFLUENCE OF FABRIC WEAVE ON MECHANICAL AND CONDUCTIVE PROPERTIES OF CARBON COATED TEXTILES

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Introduction

Conductive textiles are used to create medical sensors, heating garments, antistatic shielding. Electrical properties are obtained through different technologies. The aim of this research is to investigate the influence of the fabric weave type on mechanical and conductive properties of carbon black coated textiles.

Experimental details

Basic materials and parameters of the samples

Weave type	Density, cm ⁻¹		Mass, g/m ²	h, mm	B, μNm	
	Warp	Weft			Warp	Weft
A1 Twill	28	20	153	0.47	19.2	7.7
A2 Plain	28	20	155	0.43	22.9	15.1
A3 Satin	28	20	155	0.54	20.4	4.9

Warp 70% CO; 30% PES
Weft 100% PES

Samples 100×100 mm;
100×200 mm
For investigations samples
50×200 mm



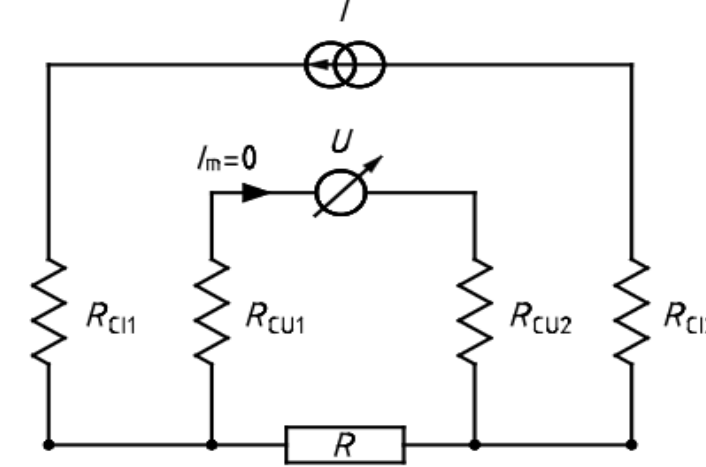
Screen printing technology



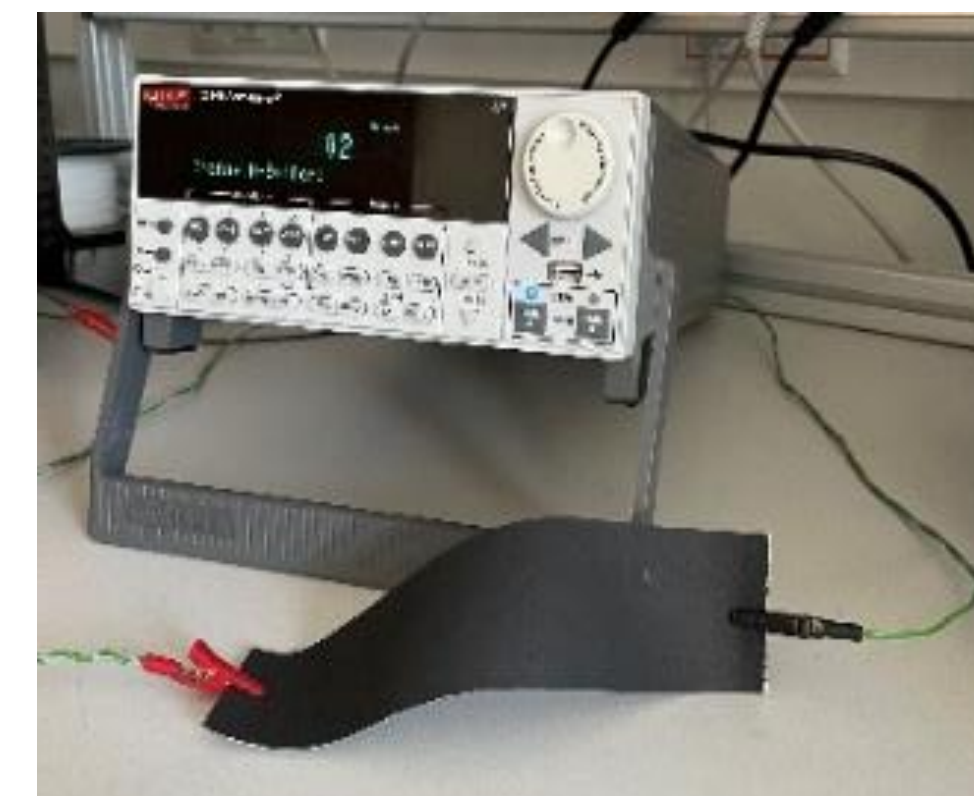
TUBICOAT ECH properties

Active content	Approx. 36 %
Thickness <i>h</i>	0.1-0.2 mm
Temperature to dry	80-100°C to dry then >140°C for 2 min
Properties	Resistance < 50 Ω/m ² when wet add on 100-200 g/m ²

Electrical resistivity determined according to EN 16812:2016.



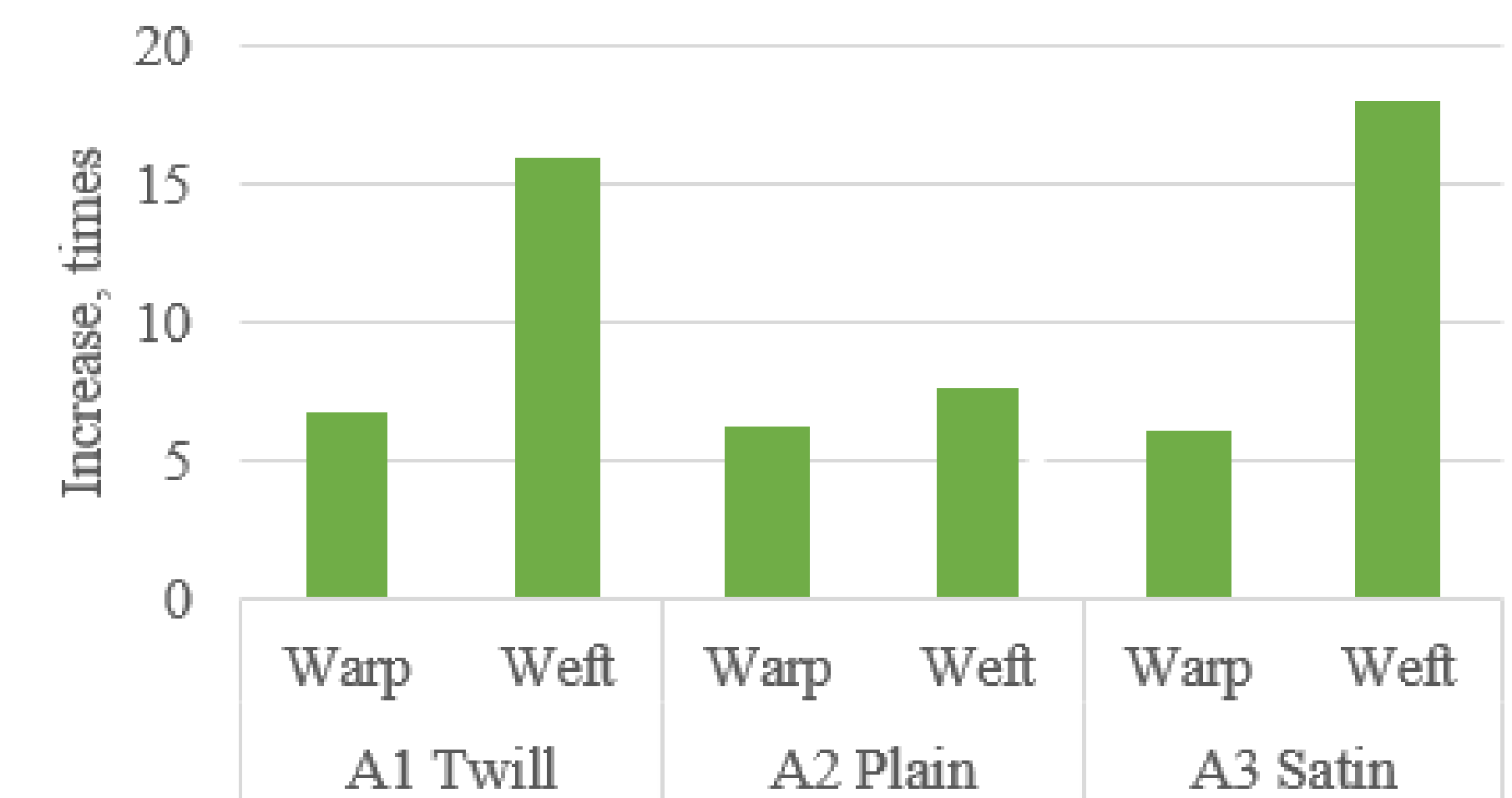
KEITHLEY 2614B
SourCeMeter®



Results

Fabric	A1 Twill		A2 Plain		A3 Satin	
	Warp	Weft	Warp	Weft	Warp	Weft
Average Resistance, Ω/m	720	751	434	623	524	613
Bending rigidity <i>B</i> , μNm	129	113	130	115	124	82
Coating absorbed, g/m ²	87		115		115	
Area density, g/m ²	240		270		270	

Change of coated samples *B* parameter comparing with base material



Conclusions

1. It was estimated that the weave type is of significant importance to prepare fabric with electrical properties by screen printing technology and TUBICOAT ECH paste.
2. Results of the experimentation and theoretical investigations has proved that plain is the best weave to create conductive textile by coating. The homogenous construction of plain weave fabric allows to obtain more uniform coating layer and lower electrical resistivity.
3. Conductive coating has influence on the mechanical properties of fabric as yarn movement during performance has been restricted.