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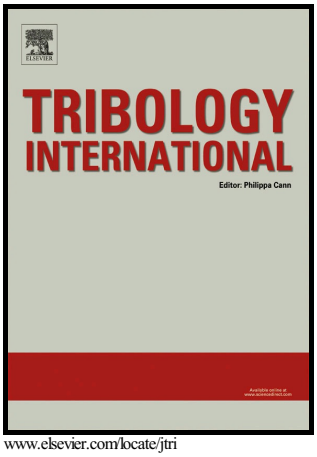

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PII: S0301-679X(16)30487-X
DOI: http://dx.doi.org/10.1016/j.triboint.2016.12.013
Reference: JTRI4497

To appear in: *Tribiology International*

Received date: 27 September 2016
Revised date: 9 December 2016
Accepted date: 12 December 2016

Cite this article as: Brigitte Camillieri and Marie-Ange Bueno, Artificial finge design for investigating the tactile friction of textile surfaces, *Tribiolog International,* http://dx.doi.org/10.1016/j.triboint.2016.12.013

Artificial finger design for investigating the tactile friction of textile surfaces

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Abstract

In order to evaluate the mechanical characteristics of a surface, correlated to the tactile perception, the use of an artificial finger is very convenient. The goal of this paper was to determine, using friction tests between human fingers and fabrics with large pile or light hairiness, the major characteristics necessary to design an artificial finger for textile fabrics. The influence of the human finger shape and fingerprints and of the fingertip stiffness has been studied. The fingerprints have a huge effect for pile fabrics. The shape and stiffness are significant to a lesser extent. An artificial finger has been designed and validated.

Keywords: Tactile, artificial finger, finger, friction, textile fabrics.

1. INTRODUCTION

During tactile tasks, the human finger is able to distinguish different kinds of materials because of their thermal properties, texture, and hardness [1-4]. More specifically for the mechanical aspects of tactile perception, Hollins *et al.* have represented the texture perceptual space with three descriptors: *soft/hard*, *smooth/rough*, and *sticky/slippery*, of which the two first are the most important [5, 6]. These results are confirmed by Picard *et al.* [7], with the influence of the country of origin of the volunteers participating in the experiment for the words used for the descriptors. A direct translation is sometimes difficult. Nevertheless, Smith and Scott showed that the descriptor *sticky/slippery* is relevant for smooth surfaces [8]. Ben Messaoud *et al*. [9] showed that friction perception depends on