

**A STUDY TO REDUCE THE LEVEL OF  
CHLORINATION OF EXAMINATION GLOVES  
WHILE KEEPING THE GLOVE MOISTURE  
CONTENT (WET GLOVE ) LOW**

**By**

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**M.Sc. Polymer Science and Technology**

**October, 2007**

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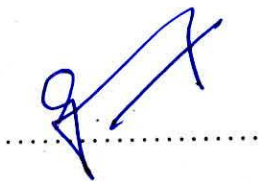
**By**

**Gamini Karunaratne**

This thesis was submitted for the partial fulfillment of the requirement for the Master Degree of Science in Polymer Science and technology of the Faculty of Applied Science, University of Sri Jayawardanapura, Sri Lanka.

October, 2007

The work described in this thesis was carried out by me under the supervision of Dr. Laleen Karunanayaka and the report on the same has not been submitted to any other university for another degree.



G. Karunaratne

I certify that the above statement made by candidate is true and this thesis is suitable for submission to the university for the purpose of evaluation.



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s  
Dr. Laleen Karunanayaka

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## ABBREVIATIONS

TS	Tensile Strength
SV	Permanent Set Value
SG	Sticky Glove
WG	Wet Glove
EAB	Elongation At Break
EDTA	Ethylene Diammine Tetra Acetic acid
ppm	parts per million
F/L	Field Latex
C/L	Centrifuged Latex
[ Ca <sup>2+</sup> ]	Calcium ion

## ACKNOWLEDGEMENT

I wish to express my most sincere appreciation and gratitude to my supervisor, Dr Laleen Karunanayaka, Senior Lecturer, Department of Chemistry, University of Sri Jayawardanapura, Sri Lanka for the generous ideas, valuable advices and guidance given, in conducting this study. His unhesitant help and co-operation at all times has contributed immensely to make this study in success. It is my bounden duty to thank him most sincerely.

I extend my gratitude to Mr. Damitha Dharmasena who was the former Executive Director of Hanwella Rubber Products ( Pvt ) Ltd. for sponsoring me to follow this M.Sc. (Polymer Science and Technology) course.

I especially, wish to express my deepest sense of gratitude to Mrs. Theja Herath The Senior Research Officer, Industrial Technology Institute for the valuable advice, kind guidance and professional expertise in writing my Thesis.

My special thanks go to Mrs. Chandani Somaratne, Lecturer, University of Moratuwa, who provides kind assistance during period of writing up of my Thesis.

I wish to thank Mr. Nilaksha Pushpakumara who is the Factory Manager of Hanwella Rubber Products (pvt) Ltd and my colleagues for their kind helps in various ways and their friendly co-operation during my research.

Especially I extend my thank to Miss. Wathsala Perera, Compounding Executive of Hanwella Rubber Produts (pvt) Ltd for her kind assistances and generous contribution in various ways.

## ABSTRACT

The primary purpose of modifying the surface of the examination gloves by chlorination process is to reduce the tackiness, which is a characteristic of the rubber. This also reduces the friction between the rubber film and other surfaces with which it comes into contact.

One of the major problems in chlorinated examination gloves is, wetting when stored after manufacture. Wetting of the gloves is caused by absorption of moisture by  $\text{Ca}^{2+}$  ions present on the surface of articles. Exposing the latex articles to the long hot water leaching process and also to the higher degree of chlorination can minimize this wetting problem. A long hot water leaching process is expensive. The higher degree of chlorination seriously affects the gloves quality as they cause degradation of gloves.

This trial experiments were carried in a glove manufacturing plant. Initially the same quality gloves were manufactured in order to subject to chlorination trials. There were six lots of gloves chlorinated with varying dosage of EDTA, 0.00g, 100g, 200g, 300g, 400g and 500g respectively at initial pre wash step in chlorination process. In one series of trial lot, the chlorine concentration was changed to 873, 764, 655, 546, 436, 327, 218 and 109 ppm respectively while keeping the rate addition of EDTA constant. The batch size was 5000 gloves per one lot in chlorination cycle.

Addition of EDTA dosage in pre wash step in chlorination process enhanced the reduction of  $\text{Ca}^{2+}$  ions content in a glove. The  $\text{Ca}^{2+}$  ions concentration of a glove is reduced due to the removal or deactivation of the  $\text{Ca}^{2+}$  ions by EDTA which leads to lesser moisture

adsorption to the surface of a glove. Our results showed that the dosage of chlorine used in chlorination process could be reduced, without effecting physical properties of the gloves.

Finally this study could be concluded as, the thin rubber articles could be chlorinated at low degree of chlorination without wetting and enhancing the good physical properties by the addition of EDTA before washing.