بسم الله الرحمن الرحيم

شبكة المعلومـــــات الجامعية

التوثيق الالكتروني والميكروفيلم

شبكة المعلومات الجامعية

جامعة عين شمس

التوثيق الالكتروني والميكروفيلم

﴿ قـــسـم ﴾

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها
علي هذه الأفلام قد اعدت دون آية تغيرات

يجب أن

تحفظ هذه الأفلام بعيداً عن الغبار

في درجة حرارة من 15 – 20 مئوية ورطوبة نسبية من 20-40 %

To be kept away from dust in dry cool place of
15 – 25c and relative humidity 20-40 %

بعض الوثائق الأصلية تالفة

بالرسالة صفحات

لم ترد بالأصـــل

Mansoura University
Faculty of Engineering
Textile Engineering Department

DUST FILTER FABRICS

BY

NEHAL MOHAMMED HASSAN EL - GHANDOUR

B. Sc. Textile Engineering

Researcher Assistant in National Research Centre

A Thesis

Submitted in partial fulfillment of the Requirements

for the Degree of Master of Science

In

Weaving Engineering

UNDER SUPERVISON

Prof. Dr.

HEMDAN ABDOU ABOU - TALEB

Prof. in Textile Engineering Department,

Faculty of Engineering,

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Assoc. Prof. Dr.

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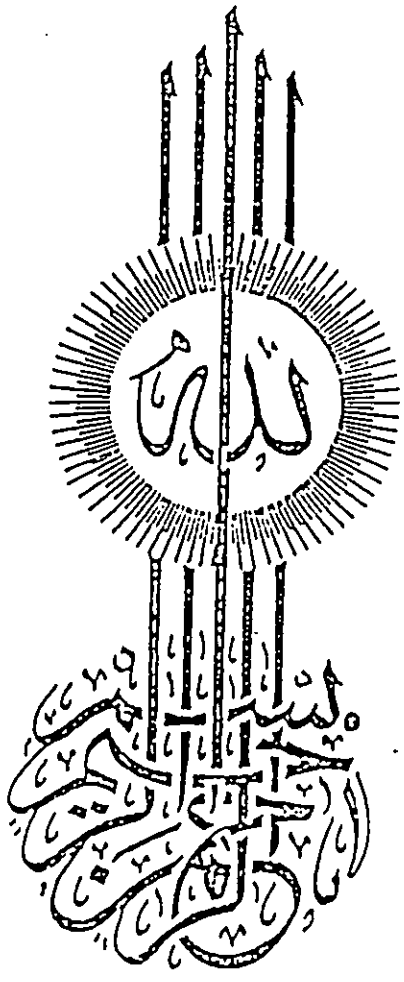

سبحانك

لا علم لنا إلا ما علمتنا إنك أنت العليم الحكيم

صدق الله العظيم

ACKNOWLEDGEMENTS

Sincere gratitude for the great assistance given by Prof. Dr. Hemdan Abdou Abou-Taleb , Professor in Textile Engineering Department , Faculty of Engineering , Mansoura University, for his help in all the thesis .

Sincere appreciation is given to Assoc. Prof. Dr. Mohammed Saad , In Textile Engineering Department ,National Research Centre .

The author would like to record his appreciation to Eng. Magdi Murad El-Aref , General Director of Textile Consolidation Fund , for his help and encouragement in analyzing the different knitted structures .

Also The author wishes to thank Prof. Dr. Sammy Mansour , the head of Textile Engineering Department ,National Research Centre for his help .

Also the author wishes to thank the Head of El-Mehalla Spinning and weaving Co. for providing us with some samples of local woven filters , the Head of Cairo Industrial Shops for Cotton and Viscose Rayon (ESCO) for his help in manufacturing the different knitted yarns and the Head of Cairo Knitting and Garments Co. (Tricona) for his help in manufacturing the different knitted structures .

Also the author would like to thank and record her appreciation to her parents and her sisters for their encouragement along the period of the research .

SUMMARY

The environment's pollution problem has become one of the most important problems which faces our society nowadays . So all the efforts are directed to control this danger , specially it has a bad effect on man's health which is considered a national wealth for any country .

The sources of this pollution are dust emission from cement and porcelain factories and dusts and fine fibres emitted from spinning mills . This thesis is concerned with the pollution from the conventional opening and cleaning lines where it has a direct effect first, on worker's health , then on material quality, also on pollution of the outer air out of the mill. consequently the control on this pollution is healthy and economical necessity .

These dusts and impurities are filtred in a room at the end of opening and cleaning line containing woven sacs (filters) through where the air which carries fine fibres and suspended impurities passes , then the fabric retains dust and impurities and the air comes out clean .

The fine fibres and impurities which are collected in filters was extracted the cotton fibres from it which are used in manufacturing medical cotton and cotton waste . Also the other trashes and dust are used by farmers as fertilizers .

Then it is clear that filtration process and filters are very important in this field also they have an economical importance if it is known that the fabrics which are used in spinning mill now are imported or local but the local have not the required specifications as the imported fabrics in conventional opening and cleaning lines .

So, the aim of this work is the development of some knitted fabric structures which are produced on the circular knitting machines to be suitable as filters in opening and cleaning lines . But it may be something new to hear that the knitted fabrics can be used as industrial fabrics, So the quick answer on this admiration is that the new technology now is the expansion in developing and using the knitted fabrics as industrial fabrics in several fields and replacing them with woven and non-woven fabrics because they have the following properties :

1 - Cheaper in cost and fastly in production .

2 - They can be produced directly in the required shape flat or circular in different diameters and different densities because of numerous types of knitted machines which give the required shape directly without seaming .

It has been produced four different knitted structures each of which with two levels of fabric weight / unit area .

Using two different types of fibres (100% cotton , 100% polyester) , the yarn specifications were as follows.

Count : (20 Ne , 30 Ne)

Twist factor : (3 α_c , 3.5 α_c)

Also plan has been designed according to the factorial design using some statistical programs , also basic program has been designed to analyze the equations for each structure , then we can select the best fabric which can be suitable as a dust filter in the conventional opening and cleaning lines .

The factors which have been studied are :

1 - Effect of type fibres (cotton - polyester) .

2 - Effect of tightness (yarn count - loop length) .

3 - Effect of twist factor .

4 - Effect of fabric structure .

This thesis has been divided into five chapters as follows :

CHAPTER (I) :

Shows the nature of the problem , its importance and how to solve it by this work .

CHAPTER (II) :

Shows a historical survey for the most important thesiss in filtration field specially dust filtration .

CHAPTER (III) :

This chapter acts the representation of the measured data , which are the fabric mechanical properties (specific work of rupture , bursting strength, abrasion, lateral expansion) and filtration properties (filtration efficiency , pressure drop, air resistance , pore diameter) . The design experiment has been shown by using four parameters (fibre type , yarn count, twist factor , average courses per inch) , then the experiment has been designed by using three factors (fibre type, tightness factor, twist factor) .

The test procedure for each property has been explained and the results have been analyzed .

CHAPTER (IV) :

The thesis ends by this chapter which represents the important results from this work .

CONTENTS

CHAPTER I

CHAPTER (I)
INTRODUCTION

1.1- Reporting the problem:

The processing of fibrous materials in the opening lines gives a gradual decrease in the size of the tufts. This takes place due to the action of the different major and minor opening points in the blow room. The opened fibrous materials transmit between different machines either mechanically or pneumatically through pipe lines. The dust suck to filters is within pipe lines. The transportion of fibrous materials or the suction of the dusts by the aid of pipe lines takes place by a condenser. The condenser consists of a fan, rotated perforated cylinder (Cage), and damper plate. The fan creates a negative pressure in the suction side of the pipe line which permits the fibrous materials to move in the pipe to the perforated cylinder. By the action of the damper plate, the fibrous materials drop to the hopper of the machine. The exhaust air of the fan which is loaded by dust moves to the filters , as shown in Fig . (1.1).

When a bale of cotton enters a spinning mill, it brings with it a stored potential to release fine dust. This dust is either present as fine dust and escapes when lint is opened or it is created when mechanical actions of processing machines break trash and fibres. Air currents generated by the machine cause the fine dust to enter the environmental air in the spinning mill, especially in the blowing room. When the cotton dust enters the mill air, worker health may be adversely affected. The essential principle of fabric filtration is to cause dusty gas to flow