

## VERIFYING THE POLYMER DRAWING MODEL OF MELT BLOWING USING FACTORY PRODUCTION DATA

by

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Short paper

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*Non-woven samples were collected from four non-woven factories. The fiber diameters of the non-woven samples were measured, which agree tally well with the predicted ones by the polymer drawing model. The paper concludes that the model can be effectively applied to the melt blowing technology.*

*Key words: melt blowing, polymer drawing, industrial verification*

### Introduction

Melt blown non-wovens are characterized by superfine fiber structures. A Lagrange type polymer drawing model for melt blowing has been established and verified by the experimental results from our laboratory [1]. In this paper, fiber diameters of non-woven samples from four non-woven factories were measured and compared with the predicted ones.

### Experiments and results

Experiments are performed on the melt blowing equipments of four non-woven factories. The image processing method is employed to measure the fiber diameter. Table 1 gives the mean values, standard deviations, and variation coefficients of measured fiber diameters, predicted fiber diameters and prediction errors. It can be found that the maximum prediction error is 8.05%, and the minimum is 6.73%. The mean prediction error is 7.31%, indicating good agreements between the predicted and measured fiber diameters, which confirms the effectiveness of the polymer drawing model in predicting fiber diameters of non-woven fabrics produced by industrial equipments in non-woven factories. The variation coefficient of measured fiber diameters of sample 4 is the minimum, which indicates a stable status of raw material, process and equipment of this sample. However, the variation coefficient of measured fiber diameters of sample 1 is the maximum. The non-woven factory is suggested to analyze and adjust the relevant raw material, process and equipment.

### Conclusions

Non-woven samples are collected from industrial equipments in non-woven factories. The fiber diameters of the non-woven samples are measured and are compared with the predicted fiber diameters with the polymer drawing model. The results show that the predicted

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**Table 1. Measured and predicted fiber diameters of samples from four non-woven factories**

Sample	Mean value of measured diameter [ $\mu\text{m}$ ]	Standard deviation of measured diameter [ $\mu\text{m}$ ]	Variation coefficient of measured diameter [ $\mu\text{m}$ ]	Predicted diameter [ $\mu\text{m}$ ]	Error [%]
1	7.682	1.3895	18.09	7.165	6.73
2	6.773	1.0562	15.59	6.296	7.04
3	8.011	1.1984	14.96	7.389	7.76
4	2.908	0.4134	14.22	2.674	8.05
5	8.076	1.2478	15.45	7.512	6.98

diameters agree tally well with the measured ones, which confirms that the polymer drawing model is effective in practical production. The results reveal the practical value of this research on the melt blowing technology.

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#### **References**

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