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STUDY OF “PALM OIL FIBER” FOR FILTRATION APPLICATION

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“I hereby, declare this thesis is result of my own research except as cited in the references”

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To my beloved family

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ABSTRACT

Current pre-filter for Air Handling Unit (AHU) is made by synthetic fiber such as glass-fiber, pleated media or polyurethane foam. The goal of this project is to diversify the existing filtration material by using palm oil fiber. Malaysia is the largest palm oil producer in the world, one of the major waste products is the Empty Fruit Bunches (EFB). We must fully use the waste products into useful final quality products is environmentally friend. To produce a natural fiber filter, some suitable treatment such as removing the residual oil and form the palm oil fiber into a mat form is needed. According to American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE), the measuring principle to test the pre-filter for AHU is gravimetric test method based on standard of ASHRAE 52.1. The results we need to obtain are the arrestance and efficiency of dust holding capacity of the filter. The objective can be achieved when the results of the arrestance is from 65% to 80% and efficiency of dust holding capacity is less than 20% for the testing.

ABSTRAK

Pra-penapis yang digunakan oleh Air Handling Unit (AHU) adalah dibuat daripada gentian semula jadi, gentian kaca, sintetik serat, perantaraan berlisu dan busa poliuretan. Projek ini dijalankan bertujuan untuk mempelbagaikan bahan penapisan sedia ada dengan menggunakan gentian tandan sawit. Malaysia adalah salah sebuah negara pengeluar minyak sawit terbesar di dunia dan ini mengakibatkan penghasilan sisa-sisa bahan buangan sawit dalam jumlah yang besar. Salah satu dari bahan buangan kelapa sawit adalah tandan dan buah kosong. Gentian kelapa sawit adalah dikeluarkan daripada bungkusan vascular kelapa sawit dalam tandan kosong. Projek ini cuba mengeksploitasi bahan buangan tersebut menjadi bahan yang berguna dan menggunakan produk-produk bahan buangan ini dengan sepenuhnya. Rawatan yang bersesuaian terhadap gentian minyak sawit untuk membuang minyak sisa dan pembentukan yang sesuai diperlukan untuk menjadikan gentian semula jadi dalam bentuk kepingan nipis. Menurut “American Society of Heating, Refrigeration, and Air Conditioning Engineers” (ASHRAE), cara untuk menguji pra- penapis bagi AHU adalah secara gravimetri. Cara gravimetri ini adalah mengikut piawaian ASHRAE 52.1. Keputusan yang diambil dalam ujian tersebut adalah *arrestance* dan *efficiency* bagi pra-penapis yang diuji.

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LIST OF SYMBOLS

E	=	Arrestance
η	=	Efficiency
M_d	=	mass of dust fed to the filter
M_f	=	final mass of the final filter
M_i	=	pretest weight of the final filter